State Of California The Resources Agency of California

Memorandum

Date: May 30, 2003
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To : John L. Geesman Commissioner and Presiding Member
Arthur H. Rosenfeld, Commissioner and Associate Member

From : California Energy Commission - **Matt Trask**
1516 Ninth Street
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Energy Commission Project Manager

Subject : **PICO POWER PROJECT STAFF ASSESSMENT, PHASE 2**

Attached please find Phase 2 of the Staff Assessment of the Application for Certification (02-AFC-3) for the Pico Power Project (PPP). Phase 1 of the SA, released March 26, covered all technical areas except Air Quality and Alternatives. Phase 2 of the SA covers those two remaining areas. With a finding in this document of no significant impact to air quality, assuming all recommended mitigation measures are enacted, staff has concluded that the project will not cause significant impacts to the environmental nor to public health, and would comply with all applicable laws, ordinances, regulations and standards (LORS). Therefore, the Alternatives analysis focused solely on alternatives to the project that would further reduce or avoid impacts that would be created by the proposed PPP. Staff concluded that the proposed PPP is the environmentally superior site, and that no other site nor different generating technologies would further reduce or avoid impacts that would occur at the proposed site, while still meeting the applicant's stated objectives for the PPP.

Staff has scheduled a workshop in Santa Clara on June 5th to discuss Phase 2 of the SA, and an evidentiary hearing covering Air Quality and Alternatives is scheduled for June 11th in Sacramento. Staff anticipates that it will file an Addendum to Phase 2 of the SA following release of the Final Determination of Compliance by the Bay Area Air Quality Management District (BAAQMD). However, because of extensive coordination between CEC staff, the BAAQMD, the California Air Resources Board and US EPA Region 9, the air quality issues of concern were extensively discussed, and staff believes there will be very few changes to its air quality analysis following release of the FDOC

With respect to all technical areas analyzed in both parts of the SA, staff recommends the Commission approve the PPP.

Cc: Gary Fay
POS
Agency/Libraries (7161, 7162)

AIR QUALITY

Testimony of Gabriel D. Taylor

INTRODUCTION

This Staff Assessment (SA) evaluates the expected air quality impacts from the emissions of criteria air pollutants due to the construction and operation of the proposed Pico Power Project (PPP) by Silicon Valley Power (SVP) in the city of Santa Clara, California. Criteria air pollutants are defined as those for which a state or federal ambient air quality standard has been established to protect public health. They include nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), precursor organic compounds (POC), particulate matter less than 10 microns in diameter (PM10) and particulate matter less than 2.5 microns in diameter (PM2.5).

In this analysis the California Energy Commission staff evaluated the following major points:

1. Whether the project is likely to conform with applicable Federal, State and Bay Area Air Quality Management District (District or BAAQMD) air quality laws, ordinances, regulations and standards, as required by Title 20, California Code of Regulations, section 1742.5 (b);
2. Whether the project is likely to cause significant air quality impacts, including new violations of ambient air quality standards or contributions to existing violations of those standards, as required by Title 20, California Code of Regulations, section 1742 (b); and
3. Whether the mitigation proposed for the project is adequate to lessen the potential impacts to a level of insignificance, as required by Title 20, California Code of Regulations, section 1744 (b).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

Under the Federal Clean Air Act (42 U.S.C. §7401 et seq.), there are two major components of air pollution law, New Source Review (NSR) and Prevention of Significant Deterioration (PSD). NSR is a regulatory process for evaluation of those pollutants that violate federal ambient air quality standards. Conversely, PSD is a regulatory process for evaluation of those pollutants that do not violate federal ambient air quality standards. The NSR analysis has been delegated by the United States Environmental Protection Agency (U.S. EPA) to the Bay Area Air Quality Management District. The U.S. EPA determines conformance with the PSD regulations. The PSD requirements apply only to those projects (known as major sources) that exceed 100 tons per year for any pollutant.

STATE

Health and Safety Code section 41700 requires that “no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or

which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property."

LOCAL

The project is subject to all applicable Bay Area Air Quality Management District (District or BAAQMD) rules and regulations, briefly described below:

Regulation 2

Rule 1 - General Requirements. This rule contains general requirements, definitions, and a requirement that an applicant submit an application for an authority to construct and permit to operate.

Rule 2 - New Source Review. This rule applies to all new and modified sources. The following sections of Rule 2 are the regulations that are applicable to this project.

- Section 2-2-301 - Best Available Control Technology (BACT) Requirement: This rule requires that BACT be applied for each pollutant which is emitted in excess of 10.0 pounds per day.
- Section 2-2-302 - Offset Requirement, Precursor Organic Compounds (POC) and Nitrogen Oxides (NO_x). This section applies to projects with an emissions increase of 50 tons per year or more of POC and/or NO_x. Offsets shall be provided at a ratio of 1.15 tons of emission reduction credits for each 1.0 ton of proposed project permitted emissions.
- Section 2-2-303 - Offset Requirements, Particulate Matter (TSP), PM10 and Sulfur Dioxide: If a Major Facility (a project that emits more than 100 tons per year of PM10) has a *cumulative increase* of 1.0 ton per year of PM10 or SO_2, emission offsets must be provided for the entire cumulative increase at a ratio of 1.0:1.0.

Emission reductions of nitrogen oxides and/or sulfur dioxide may be used to offset increased emissions of PM10 at offset ratios deemed appropriate by the Air Pollution Control Officer. A facility that emits less than 100 tons of any pollutant may voluntarily provide emission offsets for all, or any portion, of their PM10 or sulfur dioxide emissions increase at the offset ratio required above (1.0:1.0).

- Section 2-2-606 - Emission Calculation Procedures, Offsets. This section requires that emission offsets must be provided from the District's Emissions Bank, and/or from contemporaneous actual emission reductions.

Rule 7-Acid Rain. This rule applies the requirements of Title IV of the federal Clean Air Act, which are spelled out in Title 40, Code of Federal Regulations, section 72. The provisions of Section 72 will apply when the U.S. EPA approves the District's Title IV program, which has not been approved at this time. The Title IV requirements will include the installation of continuous emission monitors to monitor acid deposition precursor pollutants.

Regulation 6

Regulation 6 - Particulate Matter and Visible Emissions. The purpose of this regulation is to limit the quantity of particulate matter in the atmosphere. The following two sections of Regulation 6 are directly applicable to this project:

- Section 301 - Ringelmann No. 1 Limitation: This rule limits visible emissions to no darker than Ringelmann No. 1 for periods greater than three minutes in any hour.
- Section 310 - Particulate Weight Limitation: This rule limits source particulate matter emissions to no greater than 0.15 grains per standard dry cubic foot.

Regulation 9

Rule 1 - Limitations

- Section 301: Limitations on Ground Level Sulfur Dioxide Concentration. This section requires that emissions of sulfur dioxide shall not impact at ground level in excess of 0.5 ppm for 3 consecutive minutes, or 0.25 ppm averaged over 60 minutes, or 0.05 ppm averaged over 24 hours.
- Section 302: General Emission Limitation. This rule limits the sulfur dioxide concentration from an exhaust stack to no greater than 300 ppm dry.

Rule 9 - Nitrogen Oxides from Stationary Gas Turbines. This rule limits gaseous fired, selective catalytic reduction (SCR) equipped, combustion turbines rated greater than 10 MW to 9 ppm @ 15 percent O_2.

Regulation 10

Rule 26 - Gas Turbines - Standards of Performance for New Stationary Sources. This rule adopts the national maximum emission limits (40 C.F.R. §60) which are 75 ppm NO_x and 150 ppm SO_2 at 15 percent O_2. Whenever any source is subject to more than one emission limitation rule, regulation, provision or requirement relating to the control of any air contaminant, the most stringent limitation applies.

ENVIRONMENTAL SETTING

METEOROLOGICAL CONDITIONS

The climate of the San Francisco Bay area is dominated by a semipermanent high pressure system off the Pacific Coast, known as the Pacific High. During the summer months, the Pacific High extends to and often over the western United States, causing low pressure systems to pass north of the Pacific High into Canada and strong northwesterly air flow around the northeastern edge of the Pacific. This air flow causes colder water to accumulate close to the California coast, thus further cooling the onshore air flow. The relatively cold air temperatures cause a high incidence of coastal fog and cloud cover along the northern California coast, but the brisk westerly winds, which blow throughout the afternoon and evening hours, usually disperse the fog by late afternoon.

During the winter months, the Pacific High moves south, allowing low pressure systems to move through California. Cloud cover, precipitation, and generally strong winds prevail during this period. About 80 percent of the average annual rainfall (approximately 20 inches) in the area occurs between the months of November and March. Between storms, skies are fair, winds are light, and temperatures are moderate.

Temperatures in the general area of the proposed site are moderated by the proximity of the ocean and the San Francisco Bay. Local ambient temperatures range from the mid-50s to low-90s in the summer, fall and spring, and from the mid-40s to low-60s during the winter.

Specific local meteorological data was collected at the San Jose Airport monitoring station located, just southeast of the project site. The data sets from 1992-1995 and 1997 were proposed for use by the applicant and approved by the district. These data sets include hourly measurements of ambient temperature, Pasquill air stability class, wind speed and wind direction. Monthly wind roses, which are graphical representations showing wind speeds and directions based on the collected data from all four years, are shown in Appendix A. The local winds blow almost solely from the northwest during the spring, summer and fall seasons, but shift in the winter to blow mostly from the southeast.

Smith, Sanders and Takeuchi (1984) reported that mixing heights in the area, which represent the altitudes to which different air masses mix together, have been estimated to range from a minimum of approximately 80 meters in the morning to a maximum of 2,300 meters in the afternoon. Higher mixing heights, normally associated with unstable conditions, can lead to greater dispersion of air contaminants and lower impacts. When the mixing height is low and the wind is calm, air contaminants can be trapped near the ground and impacts will be higher due to lower dilution.

EXISTING AIR QUALITY

The U.S. EPA and the California Air Resource Board (CARB) have both established allowable maximum ambient concentrations of air pollutants based on public health impacts, called ambient air quality standards (AAQS). The state AAQS, established by CARB, are typically lower (more stringent) than the federal AAQS, established by the U.S. EPA. The state and federal air quality standards are listed in AIR QUALITY Table 1. As indicated, the averaging times for the various air quality standards (the duration over which all measurements taken are averaged) range from one hour to one year (annual). The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per unit volume of air, in milligrams (10^{-3} g, 0.001 g or mg) or micrograms (10^{-6} g, 0.000001 g or μg) of pollutant in a cubic meter (m^3) of air, averaged over the applicable time period.

AIR QUALITY Table 1
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	1 Hour	0.12 ppm (235 $\mu g/m^3$)	0.09 ppm (180 $\mu g/m^3$)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual Average	0.053 ppm (100 $\mu g/m^3$)	-
	1 Hour	-	0.25 ppm (470 $\mu g/m^3$)
Sulfur Dioxide (SO_2)	Annual Average	0.03 ppm (80 $\mu g/m^3$)	-
	24 Hour	0.14 ppm (365 $\mu g/m^3$)	0.04 ppm (105 $\mu g/m^3$)
	3 Hour	0.5 ppm (1300 $\mu g/m^3$)	-
	1 Hour	-	0.25 ppm (655 $\mu g/m^3$)
Respirable Particulate Matter (PM10)	Annual Geometric Mean	-	30 $\mu g/m^3$
	24 Hour	150 $\mu g/m^3$	50 $\mu g/m^3$
	Annual Arithmetic Mean	50 $\mu g/m^3$	20* $\mu g/m^3$
Fine Particulate Matter (PM2.5)	24 Hour	65 $\mu g/m^3$	-
	Annual Arithmetic Mean	15 $\mu g/m^3$	12* $\mu g/m^3$
Sulfates (SO_4)	24 Hour	-	25 $\mu g/m^3$
Lead	30 Day Average	-	1.5 $\mu g/m^3$
	Calendar Quarter	1.5 $\mu g/m^3$	
Hydrogen Sulfide (H_2S)	1 Hour	-	0.03 ppm (42$\mu g/m^3$)
Vinyl Chloride (chloroethene)	24 Hour	-	0.010 ppm (26 $\mu g/m^3$)
Visibility Reducing Particulates	1 Observation	-	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

* Proposed state standards expected to be implemented by the California Air Resources Board in June 2003. The new 20 $\mu g/m^3$ PM10 standard will replace the existing 30 $\mu g/m^3$ standard once approved.

In general, an area is designated as attainment for a specific pollutant if the concentrations of that air contaminant do not exceed the standard. Likewise, an area is designated as non-attainment for an air contaminant if that standard is violated. Where not enough ambient data

is available to support designation as either attainment or non-attainment, the area can be designated as unclassified. Unclassified areas are normally treated the same as attainment areas for regulatory purposes. An area can be classified attainment for one air contaminant and non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same contaminant. The entire area within the boundaries of a district is usually evaluated to determine the district's attainment status.

The Pico Power Project is located in the city of Santa Clara within the Bay Area Air Basin and is under the jurisdiction of the BAAQMD. All state and federal ambient air quality designations are presented in

Air Quality Table 2 below. Note that the region is classified as Nonattainment for both the State PM10 and State ozone AAQS.

Air Quality Table 2
Local Air Quality Classifications

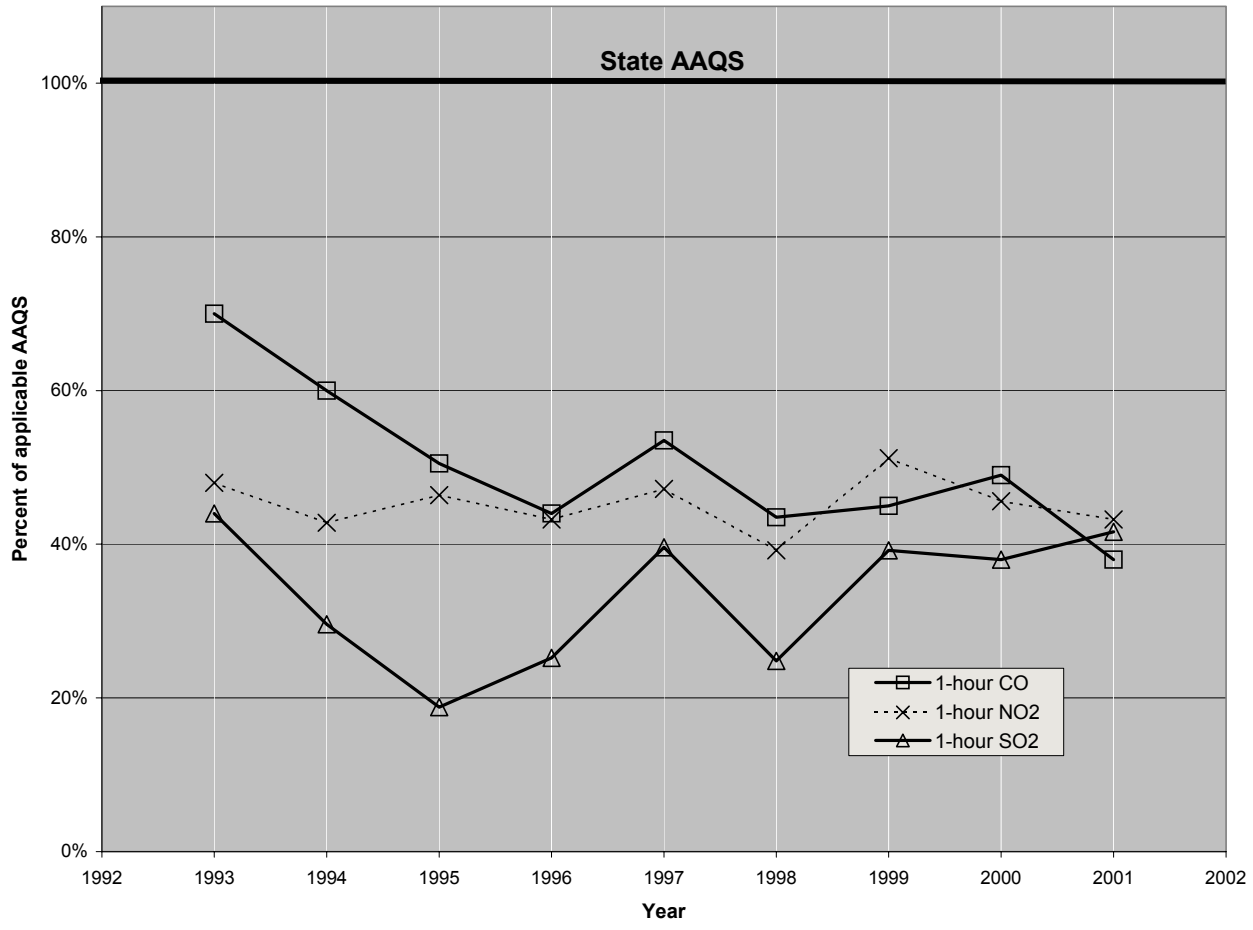
Pollutant	Averaging Time	State Designation	Federal Designation
Nitrogen Dioxide (NO_2)	1 hour	Attainment	--
	Annual	--	Attainment
Carbon Monoxide (CO)	1 hour	Attainment	Attainment
	8 hour	Attainment	Attainment
Particulate Matter (PM10)	24 hour	**Nonattainment**	Unclassified
	Annual	**Nonattainment**	Attainment
Sulfur Dioxide (SO_2)	1 hour	Attainment	--
	24 hour	Attainment	Attainment
	Annual	--	Attainment
Ozone	1 hour	**Nonattainment**	**Nonattainment**
	8 hour	--	Unclassified

Ambient air quality data has been collected extensively in the Bay Area Air Basin. CO, NO_2 and SO_2 are all classified as in attainment with both the State and Federal AAQS. AIR QUALITY Table 3 and AIR QUALITY Figure 1 below shows the maximum ambient concentrations of these three attainment pollutants measured by the BAAQMD over the past decade. The data demonstrates that the region has not experienced any recent violations of the NO_2, CO or SO_2 standards.

AIR QUALITY Table 3
BAAQMD Attainment Pollutant
Maximum Ambient Concentrations (ppm)

Pollutant	Averaging Time	1993	1994	1995	1996	1997	1998	1999	2000	2001	Limiting AAQS
CO	8-hour	7.88	8.75	5.84	7	6.11	6.27	6.28	7.03	5.09	**9**
	1 hour	14	12	10.1	8.8	10.7	8.7	9	9.8	7.6	**20**
NO_2	Annual	0.027	0.028	0.027	0.025	0.025	0.025	0.026	0.025	0.024	**0.053**
	1 hour	0.12	0.107	0.116	0.108	0.118	0.098	0.128	0.114	0.108	**0.25**
SO_2	24-hour	0.0125	0.0123	0.0117	0.0144	0.0141	0.0159	0.0382	0.0340	0.0171	**0.04**
	1 hour	0.11	0.074	0.047	0.063	0.099	0.062	0.098	0.095	0.104	**0.25**
Source: California Air Resources Board											

AIR QUALITY Figure 1
BAAQMD Attainment Pollutant
Maximum 1-hour Average Concentrations (percent of AAQS)



The following is a more detailed description of these three pollutants.

Carbon Monoxide (CO)

CO is generated from most combustion engines and other combustion activities. CO is considered a local pollutant, as it will rapidly oxidize according to the following reaction:

$2CO + O_2 \rightarrow 2CO_2$

It is thus found in high concentrations only near the source of emissions. Automobiles and mobile sources are the principal source of the CO emissions. High levels of CO emissions can also be generated from fireplaces and wood-burning stoves. Industrial sources typically constitute less than 10 percent of the ambient CO levels in the Bay Area.

The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level in what is known as the stable boundary layer. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend one or two hours after sunrise. Because the mobile sector (cars, trucks, busses and other vehicles) is the main source of CO, ambient concentrations of CO are highly dependent on emissions from the mobile sector. In fact, the peak CO concentrations occur during the rush hour traffic in the morning and afternoon. Carbon monoxide concentrations in the state have declined significantly due to two state-wide programs: 1) the 1992 wintertime oxygenated gasoline program, and 2) Phases I and II of the reformulated gasoline program. New vehicles with oxygen sensors and fuel injection systems have also contributed to the decline in CO levels in the state. Today, all the counties in California, with the sole exception of Los Angeles County, are in compliance with the state CO AAQS.

Nitrogen Dioxide (NO_2)

Most combustion engines and activities emit significant quantities of NO_x, a term used in reference to combined quantities of NO and NO_2. Only NO_2 is a criteria pollutant, and approximately 90 percent of the NO_x emitted from combustion sources is NO, while the balance is NO_2. However, NO is oxidized in the atmosphere into NO_2. The formation of NO_2 in the presence of sunlight occurs with the help of ozone according to the following reaction:

$NO + O_3 \leftrightarrow NO_2 + O_2$

In urban areas, the ozone concentration level is typically high. That level will drop substantially at night as the above reaction takes place between ozone and NO_x. This reaction explains why, in urban areas, ozone concentrations at ground level can be relatively low, while downwind rural areas (without sources of fresh NO emissions) are exposed to relatively high ozone concentrations as the reaction proceeds in reverse in the presence of sunlight.

Sulfur Dioxide (SO_2)

Sulfur dioxide is typically emitted as a result of the combustion of a fuel containing sulfur and in significant ambient quantities can lead to acid rain and environmental damage. Fuels, such as natural gas, contain very little sulfur and consequently have very low SO_2 emissions when combusted. By contrast, fuels high in sulfur content, such as lignite (a type of coal), emit large amounts of SO_2 when combusted. Sources of SO_2 emissions within the Bay Area Air Basin come from every economic sector and include a wide variety of gaseous, liquid and solid fuels.

The following sections discuss the specific ambient air conditions regarding PM2.5 and the two nonattainment criteria pollutants, PM10 and Ozone.

Respirable Particulate Matter (PM10)

PM10 can be emitted directly from a combustion process or it can be formed many miles downwind when various precursor pollutants chemically interact in the atmosphere. Gaseous emissions of pollutants such as NOx, SO_2 and Precursor Organic Compounds (POC) from turbines, and ammonia (NH_3) from NO_x control equipment can, given the right meteorological conditions, form particulate nitrates, sulfates, and organic solids. These pollutants are known as secondary particulates, because they are not directly emitted, but rather are formed outside the facility through chemical reactions in the atmosphere.

The District has recorded violations of the state 24 hour PM10 AAQS in the Bay Area Air Basin in all recent years. AIR QUALITY Table 4 below shows this data for each county in the BAAQMD, for four of the monitoring stations located in Santa Clara County, and the basin wide maximum values. The data shows that the PM10 problem is generally more significant towards the south and east regions of the basin. AIR QUALITY Figure 2 below refines this data to show a comparison between the maximum recorded ambient 24-hour average concentrations over the past nine years in the Santa Clara County and in the Bay Area Air Basin as a whole. As can be seen, the ambient PM10 levels in Santa Clara County tend to be the highest in the basin, and violations have been recorded in all recent years. AIR QUALITY Figure 2 also shows that the region does not have a convincing trend of either improving or declining ambient PM10.

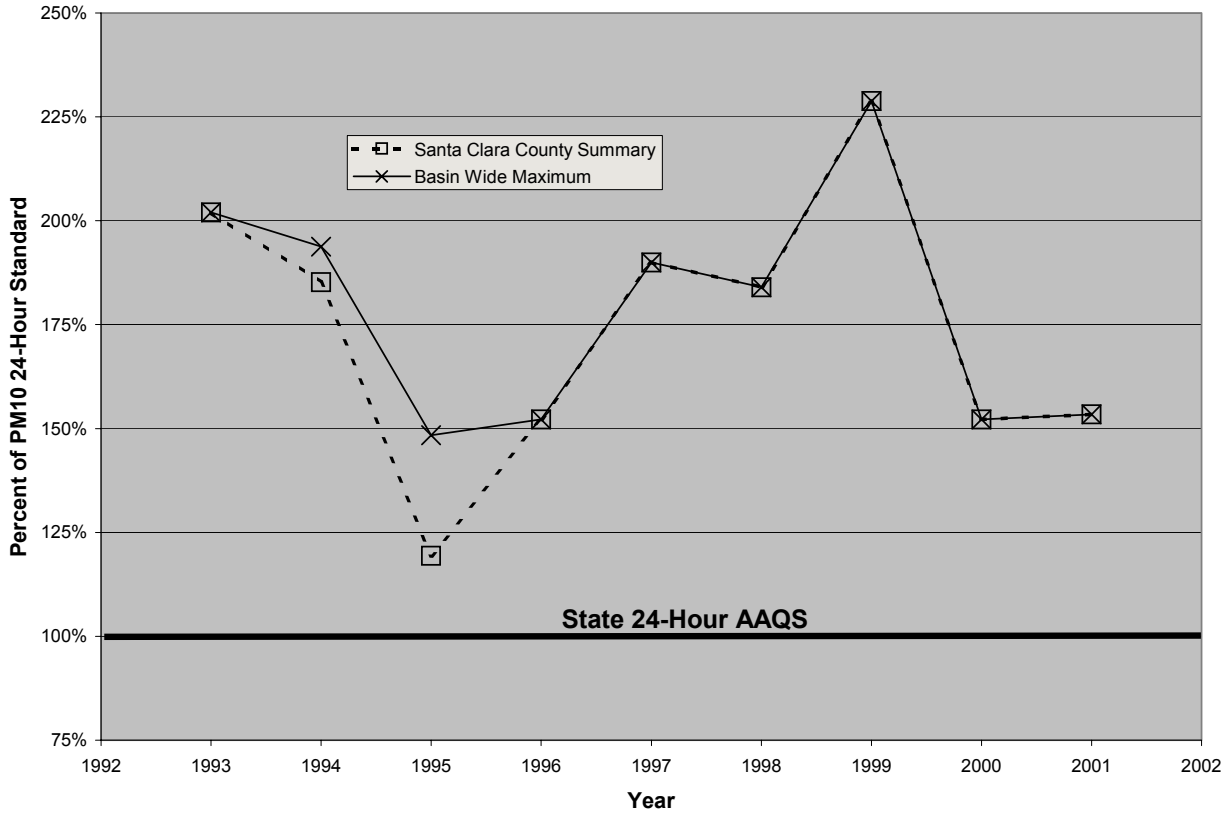
AIR QUALITY Table 4
BAAQMD PM10 Maximum 24-hour Average Concentrations and Number of Measurement Periods (6-day periods) In Violation of the State AAQS

Station	PM10	1994	1995	1996	1997	1998	1999	2000	2001
Marin County Summary	24-Hour High Avg. ($\mu g/m^3$)	72.4	74.2	50.3	72	52.4	75.6	39.5	78.8
	State Violations	4	1	0	2	1	2	0	2
SF County Summary	24-Hour High Avg. ($\mu g/m^3$)	93	49.9	70.9	81	52.4	77.9	63.2	67.4
	State Violations	6	0	2	3	1	6	2	7
Alameda County Summary	24-Hour High Avg. ($\mu g/m^3$)	96.9	51.7	71.1	64.7	62.7	87.9	71.2	108.9
	State Violations	4	2	1	2	2	3	2	3
Contra Costa County Summary	24-Hour High Avg. ($\mu g/m^3$)	87	72.7	75.6	77.8	66.8	100.6	62.0	105.8
	State Violations	4	3	1	2	2	6	1	3
Santa Clara County Summary	24-Hour High Avg. ($\mu g/m^3$)	92.6	59.7	76.1	95	92	114.4	76.1	76.7
	State Violations	7	4	2	3	3	5	7	4
San Jose 4th Street	24-Hour High Avg. ($\mu g/m^3$)	92.6	59.7	76.1	78	92	114.4	76.1	76.7
	State Violations	7	4	2	3	3	5	7	4
San Jose Piedmont Road	24-Hour High Avg. ($\mu g/m^3$)	-	57.4	58.7	55.3	54.4	-	-	-
	State Violations	-	1	2	1	1	-	-	-
San Jose Moorpark Avenue	24-Hour High Avg. ($\mu g/m^3$)	66.6	54.5	58.4	60.7	42.5	-	-	-
	State Violations	4	1	1	3	0	-	-	-
San Jose Tully Road	24-Hour High Avg. ($\mu g/m^3$)	90.2	48.6	66.8	95	88.5	96.5	68.5	75.1
	State Violations	7	0	1	3	1	4	2	4
Basin Wide Summary	24-Hour High Avg. ($\mu g/m^3$)	96.9	74.2	76.1	95	92	114.4	76.1	108.9
	State Violations	10	7	3	4	5	12	7	10

Source: California Air Resources Board

State 24-Hour Ambient Air Quality Standard for PM10: 50 $\mu g/m^3$
Federal 24-Hour Ambient Air Quality Standard for PM10: 150 $\mu g/m^3$
NA = PM10 data is not available for these years at these sites.

AIR QUALITY Figure 2
Maximum 24-hour Average PM10 Concentrations
in Santa Clara County and BAAQMD



Fine Particulate Matter (PM2.5)

Fine particulate matter, or particulate matter less than 2.5 microns in diameter, is a subset of PM10 and is generated mainly from the combustion of materials and from precursor gases (SO_x, NO_x, and POC) through photo-chemical reactions in the atmosphere. PM2.5 consists predominantly of sulfates, nitrates, ammonium, elemental carbon, and organic solids.

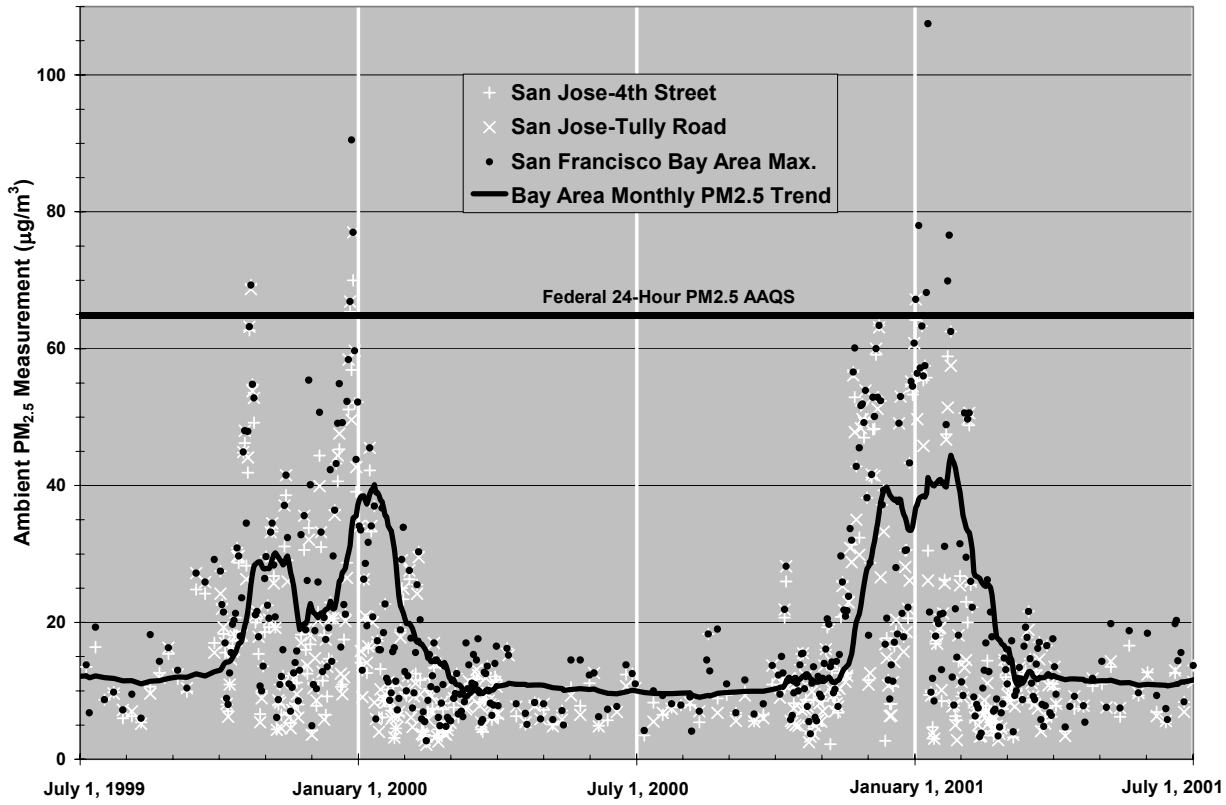
The U.S. EPA has promulgated a 65 $\mu g/m^3$ 24-hour average, and a 15 $\mu g/m^3$ annual average PM2.5 standard, but has not determined the attainment status of any air quality management district.

CARB recently adopted an annual average PM2.5 standard of 12 $\mu g/m^3$, but has not determined the attainment status of any district. CARB considered adopting a 24-hour PM2.5 standard, similar to the federal standard, but deferred the adoption of such a standard until a later date. Given the debate on the proposed state 24-hour average standard, it is not possible to estimate when or at what value a state 24-hour PM2.5 standard may be set.

Presented in AIR QUALITY Figure 3 is PM2.5 data collected at the San Jose 4th Street and San Jose Tully Road monitoring stations, as well as the Bay Area Maximum values, from summer 1999 through summer 2001. This data indicates that the highest PM2.5 concentrations normally occur during the winter months (November through January). Based

on this data, the area would likely be designated as non-attainment for both the Federal 24-hour and the State annual PM2.5 standards, but in attainment of the Federal annual standard.

AIR QUALITY Figure 3
Bay Area and San Jose PM2.5 Ambient Trend (1999-2001)



Ozone (O_3)

Ozone is not directly emitted from stationary or mobile sources; rather it is formed as the result of chemical reactions in the atmosphere between directly emitted air pollutants. NO_x and POC react with oxygen in the presence of sunlight to form ozone. Collected air quality data indicates that violations of the state and federal ozone AAQS occur primarily during the period of May through October.

In the Bay Area Air Basin, the maximum ambient ozone levels generally increase from west to east since the air coming onshore from the Pacific is generally clean. As air flows over regions of human activity, it accumulates pollutants. As the pollutants warm up, the chemical reactions that generate ozone accelerate and the ambient ozone levels increase. This atmospheric chemistry takes time to proceed however, so the secondary ozone impact from NO_x and POC emissions is generally miles down wind, to the south and east in the Bay Area Air Basin.

AIR QUALITY Table 5
Maximum Concentration of O_3 (Ozone) and
Number of Days in Violation of the State Ozone AAQS

Station	Ozone	1994	1995	1996	1997	1998	1999	2000	2001
Marin County Summary	Highest 1 hour Average (ppm)	0.089	0.088	0.105	0.106	0.074	0.102	0.071	0.087
	State Violations	0	0	2	1	0	2	0	0
SF County Summary	Highest 1 hour Average (ppm)	0.055	0.088	0.071	0.068	0.053	0.079	0.058	0.082
	State Violations	0	0	0	0	0	0	0	0
Alameda County Summary	Highest 1 hour Average (ppm)	0.129	0.155	0.138	0.114	0.146	0.146	0.152	0.113
	State Violations	7	21	23	6	22	15	9	9
Contra Costa Co. Summary	Highest 1 hour Average (ppm)	0.121	0.152	0.137	0.108	0.147	0.156	0.138	0.134
	State Violations	6	12	15	4	16	8	2	7
Santa Clara County Summary	Highest 1 hour Average (ppm)	0.130	0.145	0.129	0.114	0.147	0.125	0.113	0.123
	State Violations	8	22	24	3	22	12	4	9
Gilroy	Highest 1 hour Average (ppm)	0.101	0.13	0.121	0.095	0.135	0.105	-	0.123
	State Violations	3	10	15	1	10	3	-	3
Los Gatos	Highest 1 hour Average (ppm)	0.118	0.141	0.129	0.097	0.133	0.117	0.080	0.118
	State Violations	2	13	10	1	5	4	0	2
Mountain View	Highest 1 hour Average (ppm)	0.084	0.116	0.106	0.114	0.097	0.114	NA	-
	State Violations	0	2	3	1	2	7	NA	-
San Jose 4th Street	Highest 1 hour Average (ppm)	0.112	0.134	0.11	0.094	0.147	0.109	0.073	0.105
	State Violations	2	14	5	0	4	3	0	2
San Jose Piedmont Road	Highest 1 hour Average (ppm)	0.116	0.145	0.118	0.095	0.129	0.116	0.096	0.091
	State Violations	3	15	5	1	5	2	1	0
San Martin	Highest 1 hour Average (ppm)	0.13	0.128	0.115	0.091	0.144	0.125	0.113	0.117
	State Violations	5	14	18	0	15	7	4	7
Basin Wide Summary	Highest 1 hour Average (ppm)	0.130	0.155	0.138	0.114	0.147	0.156	0.152	0.134
	State Violations	13	28	34	8	29	20	12	15

Source: California Air Resources Board

State 1 hour Ambient Air Quality Standard for Ozone: 0.09 ppm (180 $\mu g/m^3$)
Federal 1 hour Ambient Air Quality Standard for Ozone: 0.12 ppm (235 $\mu g/m^3$)
NA = Ozone data is not available for these years at these sites.

As can be seen from AIR QUALITY Table 5 above and AIR QUALITY Figure 4 below, the ambient ozone levels in the region have consistently violated the state AAQS. AIR QUALITY

Figure 4 also demonstrates that there is evidence of either improvement or degradation of the ambient ozone condition in the basin.

AIR QUALITY Figure 4
Maximum 1-Hour Average Ozone Concentrations
in Santa Clara County and BAAQMD

PROJECT DESCRIPTION AND EMISSIONS

The Pico Power Plant will include the following major components:

- Two 48.7 MW General Electric LM6000PC Sprint combustion gas turbines. The Sprint system is a duel pressure water mist injection system for power augmentation.
- Two heat recovery steam generators equipped with 136.9 MMBtu/hr duct burners
- One mechanical draft three cell cooling tower

In addition, the project will include the following major ancillary facilities:

- Offsite linear facilities, including a two mile long natural gas pipe line and a 900 foot waste water discharge pipeline.

CONSTRUCTION

Facility construction is expected to take about 20 months. The power plant project construction consists of three major areas of activity: 1) the civil/structural construction 2) the mechanical construction, and 3) the electrical construction. The largest air emissions are generated during the civil/structural activity, where work such as grading, site preparation, foundations, underground utility installation and building erection occur. These types of activities require the use of large earth moving equipment, which generate considerable combustion emissions themselves, along with creating fugitive dust emissions. The mechanical construction includes the installation of the heavy equipment, such as the combustion and steam turbines, the heat recovery steam generators, condenser, pumps, piping and valves. Although not a large fugitive dust generation activity, the use of large cranes to install such equipment generates significantly more emissions than other construction equipment onsite. Lastly, the electrical equipment installation occurs, involving such items as transformers, switching gear, instrumentation and wiring, and is a relatively small source of emissions in comparison to the early construction activities.

The construction of these facilities will generate air emissions, primarily fugitive dust from earth moving activities and combustion emissions from construction equipment and vehicles. The projected maximum daily and annual emissions, based on the highest monthly emissions over the approximately 20 month construction period, are shown in

Air Quality Table 6.

Air Quality Table 6
Estimated Maximum Construction Emissions

	NO_x	CO	POC	PM10	SO_2
Maximum Daily Emissions (lb/day)	291.2	360.7	52.2	28.66	23.9
Maximum Annual Emissions (tons/year)	18.0	59.5	7.3	3.2	1.0
Note: Estimate based on an eight hour workday and a five day work week.					

The largest percentage of the total construction emissions from

Air Quality Table 6 will likely be emitted during the first phase of project site activity, most of it due to earth moving, grading activities and large equipment operations. The proposed linear facilities construction will produce a minor additional quantity of emissions, which have been included in the overall construction analysis.

INITIAL COMMISSIONING

New power generation facilities must go through an initial firing and commissioning phase before going fully on line. During this period, emissions may exceed permitted levels due to startups, shutdowns, periods of low load operation and testing before the low-NO_x burners and SCR systems are fine tuned for optimum performance.

The applicant identified only one commissioning scenario during which emissions may exceed normal start-up emissions: the short term (1 hour or less) commissioning of the turbine combustors, prior to installation of the SCR and CO control system. Since emissions of POC, PM10, and SO_2 are proportional to fuel use, only NO_x and CO emissions would be elevated during commissioning activities. These estimated maximum hourly NO_x and CO emissions rates are presented in

AIR QUALITY Table 7 below.

AIR QUALITY Table 7
Estimated Maximum Initial Commissioning Emissions

	NO_x	CO
Maximum Hourly Emissions (lb/hour)	18.0	45.0

Source: AFC section 8.1.5.1, pg. 8.1-34

OPERATION

Operational Profile

Though the PPP is proposed as a combined cycle facility, SVP has requested some special flexibility to operate the facility in response to demands from their native municipal load and the market in general. SVP contends that in order to meet these demands the PPP must at times function as a load following or peaking facility, rather than as a simple base load facility as is typical for combined cycle power plants. Staff has reviewed the vendor specifications for the LM6000 Sprint turbines and determined that the operational profiles proposed are consistent with both the vendor specifications and SVP needs. Nevertheless, SVP is concerned that with rapid changes in load or frequent startups and shutdowns, PPP may not be able to meet the emissions limits proposed under all circumstances. The district has thus proposed exceedance language (specified exceptions in the conditions of certification) that will allow increased short term emissions during less than two percent of the proposed annual operation time. This is discussed in more detail in the Best Available Control Technology (BACT) section below.

Emission Controls

NO_x Controls

The combustion turbines will be equipped with water injection to minimize NO_x generation and the CTG exhaust will also be treated by an SCR system before release to the atmosphere. Selective catalytic reduction refers to a process that chemically reduces NO_x to elemental nitrogen and water vapor by injecting ammonia into the flue gas stream in the presence of a catalyst and excess oxygen. The process is termed selective because the ammonia preferentially reacts with NO_x rather than oxygen. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or noble metals are also used. Newer catalysts (versus the older alumina-based catalysts) are more resistant to fuel sulfur fouling at temperatures below 770° F (EPRI 1990). Regardless of the type of catalyst used, efficient conversion of NO_x to nitrogen and water vapor requires uniform mixing of ammonia into the exhaust gas stream and a catalyst surface large enough to ensure sufficient time for the reaction to take place.

POC and CO Controls

POC and CO will be controlled at the CTG combustor and by an oxidation catalyst. An oxidation catalyst system chemically reacts organic compounds and CO with excess oxygen to form nontoxic carbon dioxide and water. Unlike the SCR system for reducing NO_x, an oxidation catalyst does not require any additional chemicals.

PM10 and SO_2 Controls

The exclusive use of an inherently clean fuel, natural gas, will limit the formation of SO_2 and PM10. Natural gas contains very little noncombustible solid residue and is thus a relatively clean-burning fuel. Natural gas does contain very small amounts of a sulfur-based scenting compound known as mercaptan, which when combusted, results in sulfur dioxide emissions. However, in comparison to other fuels used in modern thermal power plants, such as fuel oil or coal, the sulfur dioxide emissions from the combustion of natural gas are very low. A fuel sulfur content limit of 0.25 grains per 100 scf will be applied to the project and is assumed for the SO_2 emissions calculations. Like SO_2, the emissions of PM10 from natural gas combustion are also very low compared to the combustion of fuel oil or coal.

The majority of the emissions from cooling towers is pure water vapor, however a small amount of liquid water escapes and is known as "drift". Cooling tower drift consists of small water droplets, which can generate particulate matter that originates from the dissolved solids in the circulating water. To limit these particulate emissions, drift eliminators are installed in the cooling tower to capture these water droplets. The applicant intends to use drift eliminators on the cooling towers designed to limit drift to 0.0005 percent of the circulating water volume per unit time.

Best Available Control Technology (BACT)

AIR QUALITY Table 8 presents the BACT levels as determined by the BAAQMD. These recommendations are based on the BACT analysis prepared by the district and presented in the district Preliminary Determination of Compliance (PDOC).

AIR QUALITY Table 8
BAAQMD Recommended BACT Levels (@ 15% O_2)

Emissions Source	Pollutant	District BACT *	Averaging Time
CTG	NOx	2.0 ppmvd*	1 hour
CTG	POC	2.0 ppmvd	1 hour
CTG	PM10	Fuel sulfur $\leq$0.25 gr/100 scf	-
Cooling Towers	PM10	0.0005% Drift	-
CTG	CO	4.0 ppmvd	Rolling 3 hour
CTG	SO_2	Fuel Sulfur $\leq$ 0.25 gr/100 scf	-
* Allowed exceedances of up to 160 hours per year at 5.0 ppmvd, 1 hour average.			

The BAAQMD has determined that the PPP may have trouble meeting the NO_x BACT proposed under certain operating conditions. The district has thus proposed for the PPP some "exceedance language". This exceedance languages allows the facility to emit NO_x at up to 5.0 ppmvd for up to 160 hours per year, but not for more than four consecutive 15

minute periods at a time. In addition, the facility as a whole will still be required to meet the hourly, daily and annual mass emissions limits based on the BACT standards set here, regardless of allowed short term exceedances.

Project Operating Emissions

The PPP is expected to have an overall annual availability of 94 to 96 percent. The CTGs will burn only pipeline natural gas; there are no provisions for an alternative or back-up fuel. The proposed project's maximum criteria air pollutant emissions during short periods of time (approximately one hour or less) are shown in
AIR QUALITY Table 9, below.

AIR QUALITY Table 9
Facility Maximum Short-Term Emissions
(pounds per hour [lb/hr])

Operational Profile	NOx	CO	POC	PM10	SO_2
1 CTG Startup	41.0	35.0	3.0	3.33	0.31
1 CTG Steady State	3.48	4.24	1.20	3.33	0.32
Duct Burner	1.01	1.23	0.36	0.97	0.09
Cooling Tower	-	-	-	0.51	-
Total Maximum Short-Term Emissions	**45.5**	**40.5**	**4.6**	**8.1**	**0.72**

In general, higher emissions of NOx, POC and CO will occur during the start up and shut down of a large CTG because the turbine combustors are designed for maximum efficiency during full load, steady state operation. During startup, combustion temperatures and pressures change rapidly, resulting in less efficient combustion and higher emissions. Also, flue gas controls, the catalysts discussed above, operate most efficiently when a turbine operates at or near full load temperatures. These factors are offset by the fact that a turbine system of this size will start-up relatively rapidly (about one hour) and thus minimize this transient, high emissions period.

The maximum daily emissions rates for NOx, POC, PM10 and SO_2 were conservatively estimated for each power train based on 21 hours of operation with one cold startup, one shutdown and one warm start, in addition to 16 hours of duct burner operation. The total project maximum daily emissions are then conservatively estimated as the sum of the two power train worst case emissions. These estimates are presented in

AIR QUALITY Table 10.

AIR QUALITY Table 10
Project Maximum Daily Emissions
(pounds per day [lb/day])

Operational Profile	NOx	CO	POC	PM10	SO2
2 CTG Cold Starts (1 hour each)	82	70	6	6.66	0.62
40 hours (20 x 2) CTG Steady State	146.16	178.08	50.4	139.86	13.44
2 CTG Shutdowns (1 hour each)	16	20	6.0	6.66	0.62
2 CTG Warm Starts (1 hour each)	82	70	6	6.66	0.62
32 hours (16 x 2) Duct Burner	32.32	39.36	11.52	31.04	2.88
24 hours Cooling Tower	-	-	-	12.24	-
Total Maximum Daily Emissions	**358.5**	**377.4**	**79.9**	**203.1**	**18.2**

The maximum annual emissions are summarized in

Air Quality Table 11. The calculations assumes 100 percent availability and a total of 52 Cold Starts, 200 Hot Starts, 252 shutdowns and 1400 hours of duct burner operation per turbine train per year. No exceedance emissions are included in these calculations since the facility must remain below the normal operations daily and annual emissions limits regardless of the allowance for short term (one hour or less) exceedances.

Air Quality Table 11
Project Maximum Annual Emissions
(tons per year [tpy])

Per Turbine Train Annual Emissions	NOx	CO	POC	PM10	SO2
52 Cold Starts	1.07	0.91	0.08	0.09	0.01
200 Hot Starts	4.10	3.50	0.30	0.33	0.03
252 Shutdowns	1.01	1.26	0.38	0.42	0.04
8256 hours Steady State	14.37	17.50	4.95	13.75	1.32
1400 hours Duct Burners	0.71	0.86	0.25	0.68	0.06
Total per Turbine Train	**21.25**	**24.03**	**5.96**	**15.26**	**1.46**
160 hours Exceedance	0.54	0.00	0.00	0.00	0.00
8760 hours Cooling Tower	0.00	0.00	0.00	2.23	0.00
Total Facility Annual Emissions (tpy)	**43.0**	**48.1**	**11.9**	**32.8**	**2.92**

Ammonia Emissions

To control NO_x emissions from the combustion turbines, ammonia will be injected into the flue gas stream as part of the SCR system. In the presence of the catalyst, the ammonia and NO_x react to form harmless elemental Nitrogen and Water vapor. However, not all of the ammonia mixes in the flue gases to reduce NOx; a portion of the ammonia passes through the SCR and is emitted unaltered from the stacks. These ammonia emissions are known as ammonia slip.

The district has proposed an ammonia slip limit of 10 ppm for the PPP. This finding was primarily based on the Valero Cogeneration Project in Benecia, which also used the LM6000 Sprint model turbine. A review of the source test data for four different operating scenarios at

Valero (Best Environmental, 2003) showed that ammonia slip levels averaged from 3.92 ppm to 8.87 ppm, with three of the four averages over 5 ppm, all corrected to 15 percent O_2. One of the reasons that projects using the LM6000 turbine cannot routinely comply with an ammonia slip limit lower than 10 ppm is that the NO_x concentrations entering the SCR system are at approximately 25 ppm, in comparison to the larger machines where NO_x concentrations at that point are guaranteed to be below 9 to 15 ppm, depending on manufacturer. The SCR for a Frame 7 machine is designed to reduce NO_x by only 78 to 87 percent, while the SCR for an LM6000 turbine will need to reduce NO_x by approximately 92 percent in order to meet a NO_x limit of 2 ppm. This higher efficiency requirement generally leads to higher average slip levels. Staff thus believes that an ammonia slip level of 10 ppm is justified for the current LM6000 design with water injection combustor technology.

It should be noted that a maximum permitted ammonia slip rate only occurs after significant degradation of the SCR catalyst, usually five years or more after commencing operations. At that point, the SCR catalysts are removed and replaced with new catalysts. During the majority of the operational life of the SCR system, actual ammonia slip will be at 10 to 50 percent of the limit.

PROJECT IMPACTS

MODELING APPROACH

While the emissions are the actual mass of pollutants emitted from the project, the impacts are the maximum concentration of pollutants from the project that reach the ground level. When emissions are expelled at a high temperature and velocity through a relatively tall stack, the pollutants will be significantly diluted by the time they reach ground level. In contrast, the impacts from a source emitting at ground level (such as a car or lawnmower) can be much higher, even though the emissions are clearly lower, because little dilution occurs between emission and impact. The emissions from the proposed project are analyzed through the use of air dispersion models to determine the impacts at ground level.

The applicant performed an air dispersion modeling analysis using the U.S. EPA approved Industrial Source Complex Short Term, version 3, model (ISCST3) to evaluate the project's potential impacts on the area, during both construction and operation. As part of the input data for this analysis, the applicant used a local meteorological data set from the years 1992-1995 and 1997. This is a generally accepted model for this type of project and the input meteorological input data is sufficient.

CONSTRUCTION IMPACTS

The construction air quality impact analyses prepared by the applicant considered both fugitive dust generated from the construction activity and combustion emissions produced by all necessary construction equipment.

The one hour NO_2 impact was calculated using the Ozone Limiting Method (OLM). The U.S. EPA (Appendix W of 40 CFR Part 51) and CARB recommends the use of OLM as a second level screening analysis for the determination of NO_2 impacts. This method basically assumes that the conversion rate of NO to NO_2 is limited by the amount of ozone (O_3)

present in the atmosphere. This assumption is based on the fact that O_3 reacts rapidly with NO forming NO_2 and molecular oxygen.

The maximum 24-hour impacts were assessed using the emission rates for the month of maximum activity and annual impacts were assessed using the average emissions for the entire construction period. Most of the highest emissions are estimated to occur approximately halfway through the 20 month construction period. The results of this modeling effort are shown in AIR QUALITY Table 12.

AIR QUALITY Table 12
Maximum Construction Impacts ($\mu g/m^3$)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	1 hour	212.7	244	456.7	470	97%
	Annual	10.2	49	59.2	100	59%
CO	1 hour	750	10,350	11,100	23,000	48%
	8 hour	324	7,811	8,135	10,000	81%
PM10	24 hour	46.4	114	160.4	50	321%
	Annual Geo. Mean	10.7	25.3	36	30	120%
SO_2	1 hour	157.4	78.6	236	655	36%
	24 hour	22.7	21	43.7	105	42%
	Annual	1.2	8	9.2	80	12%

Source: AFC Appendix E, Table 8.1E-4

The construction of the PPP may result in elevated air quality impacts (one hour NO_2, 24 hour PM10 and annual PM10), which the general public could be exposed to. Staff believes that this calculated impact may be unrealistically high due to excessively conservative (i.e. over predictive) modeling protocols. Nevertheless, staff believes that the emissions from the construction of the project present a potentially significant impact because they will contribute to existing violations of the state 24 hour average PM10 AAQS, and that those emissions can and should be mitigated to a level of insignificance. Staff recommends construction conditions of certification to mitigate these construction impacts to the extent feasible. These measures are addressed under the "Staff Proposed Mitigation" section below.

INITIAL COMMISSIONING

The conservative, screening level modeling analysis of the initial commissioning impacts for both NO_x and CO are well below the most limiting AAQS and are presented in. Since the most conservative level of modeling shows no potential violation of AAQS, no refined modeling was performed on the initial commissioning activities.

AIR QUALITY Table 13
Maximum Screening Level Impacts from Initial Commissioning ($\mu g/m^3$)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	1 hour	89.8	244	333.8	470	71%
CO	1 hour	224.4	10,350	12,410	23,000	46%

Source: AFC section 8.1.5.1, pg. 8.1-36

PROJECT OPERATION IMPACTS

While the construction and commissioning impacts are both relatively short lived, the operation impacts from the project will continue throughout the life of the facility. The operation impacts are thus subjected to a more refined level of analysis. The following sections discuss the air quality impacts of project operation under fumigation meteorological conditions, during combustion turbine startup and during steady-state operations.

Fumigation Impacts

Surface air is usually very stable during the early morning hours before sunrise. During such meteorological conditions, emissions from elevated stacks rise through this stable layer and are dispersed and diluted. When the sun first rises, the air at ground level is heated resulting in turbulent vertical mixing (both rising and sinking) of air within a few hundred feet of the ground. Emissions from a stack that enter this turbulent layer of air will also be vertically mixed, bringing some of those emissions down to ground level before significant dispersion occurs and possibly causing abnormally high impacts. As the sun continues to heat the ground, this vertical mixing layer becomes thicker and thicker, and the emissions plume becomes better dispersed. The early morning air pollution event, called fumigation, usually lasts approximately 30 to 90 minutes.

The applicant used the U.S. EPA approved SCREEN3 model (version 96043) for the calculation of fumigation impacts, without a shore line assumption since the proposed facility is 11.5 km from the nearest large body of water (the San Francisco Bay). AIR QUALITY Table 14 shows the highest modeled fumigation impacts in comparison with the one hour NO_2, SO_2 and CO standards. The worst case one hour emissions levels for each pollutant identified in
AIR QUALITY Table 9 were assumed. Since fumigation impacts will not typically occur for more than a one hour period, only the impacts on the one hour standards are shown. The results of the modeling analysis show that fumigation impacts will not violate any of the one hour standards.

AIR QUALITY Table 14
CTG Fumigation Modeling
Maximum 1 hour Impacts ($\mu g/m^3$)

Pollutant	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	7.46 [a]	244	251	470	54%
CO	3.63	10,350	10,354	23,000	45%
SO_2	0.27	78.6	78.9	655	12%

[a] NO_x emissions based on the excursion situation of 5 ppm NO_x corrected to 15 percent O_2.

Refined Modeling Analysis

The applicant provided a refined modeling analysis, using the ISCST3 model to quantify the potential impacts of the project during both steady state operation and startup conditions. The worst case (maximum) results of this modeling analysis are shown in AIR QUALITY Table 15.

AIR QUALITY Table 15
Refined Modeling Maximum Impacts ($\mu g/m^3$)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	1 hour [a]	193.4	244	437	470	93%
	1 hour [b]	29.5	244	273	470	58%
	1 hour [c]	73.8	244	318	470	68%
	Annual	0.52	49	50	100	50%
CO	1 hour [a]	393.99	10,350	10,744	23,000	47%
	1 hour [b]	35.99	10,350	10,386	23,000	45%
	8 hour	51.4	7,811	7,862.4	10,000	79%
PM10	24 hour	4.46	114	118	50	237%
	Annual Geo. Mean	0.89	25.3	26.2	30	87%
SO_2	1 hour	2.7	78.6	81.3	655	12%
	24 hour	1.0	21	22	105	21%
	Annual	0.038	8.0	8.0	80	10%

[a] modeled 1 hour average impacts during startup event
[b] modeled 1 hour average impacts during steady state operation
[c] modeled 1 hour average impacts during an approved exceedance of one full hour duration

Startup impacts are much larger than steady state impacts not only because the emissions are larger, but also because the flue gas stream is ejected at a lower velocity and temperature. This change in emissions rate means the pollutants will settle faster and thus have less time to dilute before reaching the ground. Note that the value presented is very conservative, and thus real startup events are likely to have significantly less impact.

This table shows that during worst case normal operations the facility will not cause a surface level violation of any ambient air quality standards, though it will contribute to the existing PM10 problem. Note that this analysis conservatively assumes the highest single one hour ambient NO_x level (244 $\mu g/m^3$) from the past eight year as a background to which all project impacts are added to determine the final level of impact. Because such a high background level is extremely unlikely to occur at the same location as the maximum impacts from the project, these modeled conditions are considered worst case and thus conservative.

Since the project's impacts do not cause a violation of any NO_2, CO or SO_2 ambient air quality standards under such conservative assumptions, staff considers the project impacts for those pollutants to be insignificant. However, all project emissions of PM10 would

contribute to the existing PM10 problem in the Bay Area, and thus are considered a cumulatively significant impact.

Secondary Pollutant Impacts

The project's gaseous emissions of NOx, SO_2, POC and ammonia can contribute to the formation of the secondary pollutants ozone and PM10. There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are input into the modeling to determine ozone impacts. There are no models approved by a regulatory agency for assessing single source ozone impacts. However, because of the known relationship of NO_x and POC emissions to ozone formation, it can be said that the emissions of NO_x and POC from the project do have the potential (if left unmitigated) to contribute to higher ozone levels in the region.

There is a known relationship between emissions of ammonia, NO_x and SO_2 and the formation of ammonium nitrate and sulfate-based PM10. Whether the ammonia, NO_x and SO_2 impacts are significant depends on the likelihood of ambient PM10 violations. The Bay Area Air Basin currently experiences violations of the state AAQS and is classified as a nonattainment area for the state PM10 AAQS. Staff thus considers both the primary and secondary PM10 emissions from the project to be a significant contribution to an existing problem.

VISIBILITY IMPACTS

A visibility analysis of the project's gaseous emissions would be required if the project were subject to the Federal Prevention of Significant Deterioration (PSD) permitting program. However, the PPP is not subject to PSD permitting because it does not trigger the emission limits for such a review, so no visibility analysis was completed for this project. The nearest Class I areas to the Pico Power Project are the Point Reyes National Seashore and the Pinnacles National Monument. Due to the distance to Class I areas and the fact that this project is not a major stationary source, the project's visibility impacts on Class 1 areas are considered insignificant.

LOCAL CUMULATIVE IMPACTS

To evaluate reasonably foreseeable future projects as part of a cumulative impact analysis, staff needs specific information. The time in which a probable future project is well enough defined to have the information necessary to perform a modeling analysis is usually when that project applicant has submitted an application to the District for a permit. Air dispersion modeling required by the District would necessitate that the applicant develop the necessary modeling input parameters to perform a modeling analysis. Therefore, we evaluate those future projects that are currently under construction, or are currently under District review in our cumulative impact analysis. Projects located up to six miles from the proposed facility site usually need to be included in the analysis.

The applicant obtained an inventory from BAAQMD identifying all proposed facilities within eight miles of the PPP site that have not yet commenced operations. The inventory identified 61 projects, 16 of which have proposed emissions significant enough to include in the cumulative analysis. The maximum modeled cumulative impacts of these 16 proposed sources combined with the PPP are presented below in AIR QUALITY Table 16. The total

impact in this case is conservatively estimated to be the maximum modeled impact plus the maximum existing background pollutant levels.

AIR QUALITY Table 16
Maximum Modeled Cumulative Impacts ($\mu g/m^3$)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	1 hour	197.04	244	441	470	94%
	Annual	12.17	49	61	100	61%
CO	1 hour	328.83	10350	10679	23,000	46%
	8 hour	165.58	7811	7977	10,000	80%
PM10	24 hour	4.49	114	118	50	237%
	Annual Geo. Mean	1.22	25.3	26.5	30	88%
SO_2	1 hour	41.26	78.6	119.9	655	18%
	24 hour	10.19	21.0	31.2	105	30%
	Annual	2.53	8.0	10.5	80	13%

The prepared cumulative modeling used very conservative assumptions in an attempt to produce a worst case impact scenario and then to examine the effects of emissions from PPP on that scenario. The PPP contributed a relatively small amount to the above impacts, however it is important to examine each addition to an environment. This analysis again shows that the existing PM10 levels in the region are unacceptably high, and any further impact should be considered significant and be fully mitigated.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed PPP (please refer to Socioeconomics Figure 1 of the Staff Analysis), and Census 1990 information that shows the low-income population is less than fifty percent within the same radius. Based on this analysis staff, there are no unmitigated significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no air quality related environmental justice issues related to this project.

MITIGATION

APPLICANT'S PROPOSED MITIGATION

Construction Mitigation

The applicant proposes a number of mitigation and emissions control measures for use during the construction of the project. The applicant specifically proposes the following measures to control exhaust emissions from heavy diesel construction equipment:

- Operational measures, such as limiting time spent with the engine idling by shutting down equipment when not in use;
- Regular preventive maintenance to prevent emission increases due to engine problems;
- Use of low sulfur and low aromatic fuel meeting California standards for motor vehicle diesel fuel; and
- Use of low-emitting gas and diesel engines meeting state and federal emissions standards for construction equipment, including, but not limited to catalytic converter systems and particulate filter systems.

The applicant further proposes the following measures to control fugitive dust emissions during construction of the project:

- Use either water application or chemical dust suppressant application to control dust emissions from unpaved road travel and unpaved parking areas;
- Use vacuum sweeping and/or water flushing of paved road surfaces to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas;
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard;
- Limit traffic speeds on unpaved site areas to 5 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to roadways;
- Replant vegetation in disturbed areas as quickly as possible;
- Use wheel washers to wash off tires of all trucks exiting the construction site; and
- Mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water or chemical dust suppressant.

Operations Mitigation

A discussion of the proposed emission controls for the project is presented under the Emissions Controls section under the Project Description and Emissions heading above.

PM10 Mitigation

Although the Bay Area Air Basin is classified as nonattainment for the state PM10 AAQS, the project will not be required by the BAAQMD to provide PM10 offsets because the quantity of PM10 emitted by the project is below the district's offset threshold of 100 tons per year (as set by district rule). However, based on mitigation required for previous projects approved by the Commission in the BAAQMD, the applicant has submitted a PM10 Mitigation Plan.

The applicant proposes to fund the district's existing wood stove and fireplace retrofit/replacement program. Under this program, the BAAQMD will administer the distribution of approximately $161,000 as incentives for private individuals in the vicinity of the proposed project site to retrofit or replace their older, uncertified wood stoves and fireplaces. Eligible individuals will receive an incentive payment of $300 to $500 for

retrofitting or replacing their operational, uncertified wood stove or fireplace with a natural gas stove or fireplace insert. The BAAQMD will track the number of replacements and retrofits funded and will report periodically to the applicant and to the CPM.

Emission Offsets

District Regulation 2-2-302 requires that the applicant provide emission offsets, in the form of banked Emission Reduction Credits (ERC), for the project's emissions of NOx. The projected emissions of PM10, POC and SO_2 are below the district's thresholds for requiring offsets. For facilities emitting between 15 and 50 tons/year of NOx, District Regulation 2-2-302 requires a trading ratio of 1:1 (i.e. for every one ton of NO_x emissions from the facility, 1 ton of NO_x emission reduction credits must be provided). District Regulation 2-2-302.2 allows POC credits to be used in place of NO_x credits on a 1:1 basis, as either pollutant is considered to be a precursor pollutant to the formation of ozone.

The applicant is currently in possession of sufficient ERC certificates to fully satisfy these conditions. These certificate's numbers, the location of the source they were derived from, and the amount of emissions reductions they represent are presented in AIR QUALITY Table 17 below.

AIR QUALITY Table 17
Emission Reduction Credits

ERC Number	Source Location (City)	Date Banked	Source Type	NOx (tpy)	POC (tpy)
861	Martinez	5/22/1987	Refinery Modification	51.5	-
860	South San Francisco	12/6/1994	Paint Manufacturer Shutdown	-	5.0
865	Oakland	5/30/2002	Dematuring Tank Modification	-	6.5
			Total ERCs Owned	51.5	11.5
			Pico Power Project Emissions Limits	43.0	111.9

ADEQUACY OF PROPOSED MITIGATION

Construction Mitigation

Because of the potentially significant short-term NO_x impact and predicted significant contribution to both the short- and long-term PM10 problems caused by construction activities associated with the project, staff does not consider the proposed construction mitigation to be sufficient.

Operations Mitigation

NO_x Controls

The permitted NO_x emissions level will be reached through water injection into the CTGs and and SCR system with injected aqueous ammonia used to treat all exhaust. These controls will limit the NO_x emissions to 2.0 ppmvd with an allowance of 160 hours per year of exceedance emissions at 5.0 ppmvd. The BAAQMD has found this level of control to be BACT for this type of facility.

POC and CO Controls

The permitted POC and CO emissions levels will be reached through the use of an oxidation catalyst system to treat all exhaust gasses. The proposed controls will limit emissions to 2.0 ppmvd POC and 4.0 ppmvd CO. The BAAQMD has found these levels to be BACT for this type of facility.

PM10 and SO_2 Controls

The sole use of natural gas fuel with a certified sulfur content not greater than 0.25 grains per 100 scf satisfies BACT requirements found by the BAAQMD for both PM10 and SO_2. This level of emissions control is thus considered adequate to control direct PM10 and SO_2 emissions.

Cooling Towers

The applicant's use of drift eliminators with an efficiency of 0.0005 percent on the proposed cooling tower represents the state-of-the-art of drift eliminator design. This level of emissions control is thus considered adequate to minimize potential PM10 emissions.

PM10 Mitigation

If built as proposed, the project would add approximately 33 tons per year of PM10 to the Bay Area Air Basin, resulting in a maximum 24-hour average ground level ambient impact increase of 4.46 $\mu g/m^3$, as shown in AIR QUALITY Table 15. Since the air basin already experiences violations of the state PM10 AAQS (AIR QUALITY Table 4), and is thus classified as nonattainment for that standard, this addition will contribute to existing violations and is thus a significant cumulative impact requiring mitigation.

Staff has two goals with regard to the PM10 mitigation plan for the PPP. First, the mitigation plan must be complete and in place at the beginning of construction, with real mitigation realized by the beginning of the initial commissioning phase. Second, it is important that the PM10 mitigation benefit be directed as much as practical to coincide with the impacts from the project.

The applicant's proposed PM10 mitigation plan requires significant action on the part of the BAAQMD. Though a formal agreement between the district and the SVP is necessary before the plan is complete, the proposed plan is sufficient in concept to mitigate this impact. Staff will work with the applicant and district to finalize an agreement and publish the results in an addendum to this Staff Assessment.

Emissions Offsets

Though the BAAQMD rules do not require POC ERCs to be submitted for the project, staff believes that all ozone precursors (NO_x and POC) must be fully offset since the region is not in attainment of the ozone AAQS and the project's POC emissions could contribute to ozone formation. The applicant agreed to fully mitigate both NO_x and POC. The proposed emissions offsets will fully mitigate both the NO_x and POC emissions from the project, and further, the total quantity of ERC provided will satisfy the district requirement for 1:1 offset ratio of NO_x.

The CO emissions impacts from the project do not cause a violation of any CO AAQS as shown in AIR QUALITY Table 15 and thus are not significant.

STAFF PROPOSED MITIGATION

Construction Mitigation

The modeling assessment discussed earlier shows that the combustion sources used for heavy construction have the potential for causing significant air quality impacts, specifically on the one hour NO_2 and 24 hour PM10 AAQS. Staff has determined that a viable emissions control technology for all heavy diesel powered construction equipment that does not use a CARB certified low emission diesel engine and ultra-low sulfur content diesel fuel is the use of oxidizing soot filters.

In addition, staff proposes that prior to the commencement of construction, the applicant provide a Fugitive Dust Mitigation Plan (FDMP) that specifically spells out the mitigation measures that the applicant will employ to limit fugitive dust during construction. Please see the Conditions of Certification section of this analysis for proposed conditions.

FACILITY CLOSURE

Eventually the Pico Power Project will close, either as a result of the end of its useful life, or through some unexpected situation such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions would cease and thus all impacts associated with those emissions would cease as well.

A Permit to Operate, issued by the District under Regulation 2-3-302, is required for operation of the facility. If the applicant chooses to close the facility and not pay the permit fees, then the Permit to Operate would be cancelled. In that event, the project could not restart and operate unless the applicant complied with state and District requirements and paid the fees to renew the Permit to Operate.

When the applicant decides to dismantle the project, there will potentially be emissions associated with the dismantling effort. The Facility Closure Plan to be submitted to the Energy Commission Compliance Project Manager will include the specific details regarding how the applicant plans to comply with all local, state and federal rules and regulations during facility closure and demolition.

COMPLIANCE WITH LORS

FEDERAL

Compliance with the applicable federal Clean Air Act regulations for the PPP project was documented in the District's PDOC.

STATE

Pending resolution of the issues discussed herein and with full mitigation (emissions offsets, mitigation plans, and/or controls) of all significant emissions from the project, staff anticipates compliance with Section 41700 of the California State Health and Safety Code.

LOCAL

The BAAQMD issued a Preliminary Determination of Compliance for public comment on May 19, 2003 including a full set of proposed permit conditions. The district finds the project in compliance with all district rules and regulations.

CONCLUSIONS AND RECOMMENDATIONS

Staff has reviewed the applicant's documentation and the District's PDOC and concludes that the project will not cause any significant impact on any ambient air quality standard, provided the following proposed Conditions of Certification are strictly adhered to.

CONSTRUCTION AND COMMISSIONING CONDITIONS OF CERTIFICATION

AQ-C1 The project owner shall fund all expenses for an on-site air quality construction mitigation manager (AQCMM) who shall be responsible for maintaining compliance with conditions **AQ-C2** through **AQ-C4** for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities identified in Conditions AQ-SC1 through AQ-SC4 to one or more air quality construction mitigation monitors. The on-site AQCMM shall have full access to areas of construction of the project site and linear facilities, and shall have the authority to appeal to the CPM to have the CPM stop any or all construction activities as warranted by applicable construction mitigation conditions. The on-site AQCMM, and any air quality construction mitigation monitors responsible for compliance with the requirements of AQ-SC4, shall have a current certification by the California Air Resources Board for Visible Emission Evaluation prior to the commencement of ground disturbance. The AQCMM may have other responsibilities in addition to those described in this condition. The on-site AQCMM shall not be terminated without written consent from the CPM.

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit to the CPM, for approval, the name, current ARB Visible Emission Evaluation certificate, and contact information for the on-site AQCMM and air quality construction mitigation monitors.

AQ-C2 The project owner shall provide a construction mitigation plan, for approval, which shows the steps that will be taken, and reporting requirements, to ensure compliance with conditions **AQ-C3** and **AQ-C4**.

Verification: At least 60 days prior to start any ground disturbance, the project owner shall submit to the CPM, for approval, the construction mitigation plan. The CPM will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt. Otherwise, the plan shall be deemed approved.

AQ-C3 The on-site AQCMM shall submit to the CPM, in the monthly compliance report, a construction mitigation report that demonstrates compliance with the following mitigation measures:

a) All unpaved roads and disturbed areas in the project and linear construction sites shall be watered every four hour of construction activities, or until sufficiently wet to comply with the dust mitigation objectives of Condition AQ-SC4. The frequency of watering can be reduced or eliminated during periods of precipitation.
b) No vehicle shall exceed 10 miles per hour within the construction site.
c) The construction site entrances shall be posted with visible speed limit signs.
d) All vehicle tires shall be washed or cleaned free of dirt prior to entering paved roadways.

e) Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.
f) All entrances to the construction site shall be graveled or treated with dust soil stabilization compounds.
g) No construction vehicles can enter the construction site unless through the treated entrance roadways.
h) Construction areas adjacent to any paved roadway shall be provided with sandbags to prevent run-off to the roadway.
i) All paved roads within the construction site shall be swept twice daily.
j) At least the first 500 feet of any public roadway exiting from the construction site shall be swept twice daily.
k) All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or be treated with appropriate dust suppressant compounds.
l) All vehicles that are used to transport solid bulk material and that have potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least one foot of freeboard.
m) Wind erosion control techniques, such as wind breaks, water, chemical dust suppressants and vegetation, shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.
n) Any construction activities that cause fugitive dust in excess of the visible emission limits specified in Condition **AQ-C4** shall cease when the wind exceeds 15 miles per hour.
o) All diesel-fueled engines used in the construction of the facility shall be fueled only with ultra-low sulfur diesel, which contains no more than 15 ppm sulfur.
p) All large construction diesel engines, which have a rating of 50 hp or more, shall meet, at a minimum, the Tier 1 ARB/U.S. EPA certified standards for off-road equipment.
q) All large construction diesel engines, which have a rating of 50 hp or more that do not have an U.S. EPA Tier 1 particulate standard (50 to 175 hp engines) and do not meet Tier 2 particulate standards, shall be equipped with catalyzed diesel particulate filters (soot filters), unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types.
r) All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM that shows the engine meets the conditions **AQ-C3(p)** and **AQ-C3(q)** above.

Observations of visible dust plumes would indicate that the existing mitigation measures are not resulting in effective mitigation. The AQCMM shall implement the following procedures for additional mitigation measures if the AQCMM determines that the existing mitigation measures are not resulting in effective mitigation:

a) The AQCMM shall direct more aggressive application of the existing mitigation methods within 15 minutes of making such a determination.

b) The AQCMM shall direct implementation of additional methods of dust suppression if step a) specified above, fails to result in adequate mitigation within 30 minutes of the original determination.

c) The AQCMM shall direct a temporary shutdown of the source of the emissions if step b) specified above fails to result in adequate mitigation within one hour of the original determination. The activity shall not restart until one full hour after the shutdown. The owner/operator may appeal to the CPM any directive from the AQCMM to shutdown a source, provided that the shutdown shall go into effect within one hour of the original determination unless overruled by the CPM before that time.

Verification: In the MCR, the project owner shall provide the CPM a copy of the construction mitigation report and any diesel fuel purchased records, which clearly demonstrates compliance with condition AQ-C3.

AQ-C4 No construction activities are allowed to cause visible dust emissions at or beyond the project site fenced property boundary. No construction activities are allowed to cause visible dust plumes that exceed 20 percent opacity at any location on the construction site. No construction activities are allowed to cause any visible dust plume in excess of 200 feet beyond the centerline of the construction of linear facilities.

Verification: The on-site AQCMM shall conduct a visible emission evaluation at the construction site fence line, or 200 feet from the center of construction activities at the linear facility, each time they see excessive fugitive dust from the construction or linear facility site. The records of the visible emission evaluations shall be maintained at the construction site and shall be provided to the CPM on the monthly construction report.

AQ-C5 The project owner shall submit to the CPM for review and approval any modification proposed by either the project owner or issuing agency to any project air permit.

Verification: The project owner shall submit any proposed air permit modification to the CPM within five working days of its submittal either by 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt.

AQ-C6 The project owner shall submit a plan for a fireplace retrofit/wood stove replacement program to the CPM for approval. The plan shall provide the following elements:

a) Provisions for a replacement fund to be made available on a first-come, first-serve basis to finance a five-year voluntary wood stove replacement/fireplace retrofit program. The replacement fund shall pay for the retrofit/replacement costs of current non-U.S. EPA certified fireplaces and wood stoves (up to a maximum of $1,250 for each retrofit/replacement) with a U.S. EPA-certified solid fuel heating device. The fund shall be capable of being drawn upon in any year of the five year program and as allowed by conditions of certification until the fund is depleted.

b) A list of approved retailers and professional, licensed installers. Each resident participating in the retrofit/replacement program would only do business with listed retailers or installers. Payments shall only be made to vendors or contractors who agree to participate in the program and who submit certification that the retrofit/replacement is permanent (by permanent removal of the wood stove doors and proper recycling of the old stove) and conforms to program requirements.

c) A schedule for submission to the CPM of quarterly status reports on the program, the status of reimbursements, and remaining funds available. In addition, the fund shall be audited annually.

d) A description of eligibility requirements, including that, for the first three years of the program, homes and businesses located within a 15-mile radius of the proposed facility will be eligible to participate in the program. Homes and businesses within a 25-mile radius of the CPP facility would be eligible to participate in the fourth and fifth years if there are remaining funds.

e) A detailed schedule of deliverables.

Verification: No later than 30 days prior to commencement of construction, the project owner shall provide the CPM, for approval, a copy of the wood stove replacement program.

AQ-C7 The following ERC Certificates, and the amounts specified shall be surrendered per the requirements of Condition AQ-41:

ERC Certificate 861 (51.5 tons NOx),
ERC Certificate 860 (5.0 tons POC),
ERC Certificate 865 (6.5 tons POC).

Verification: At least 60 days prior to commencing turbine first fire, the project owner/operator must surrender the ERC certificates identified above to the District and provide copies to the CPM.

CONDITIONS OF CERTIFICATION

The following Conditions of Certification are based upon conditions mandated by the Bay Area Air Quality Management District, which applies the conditions to each emission source of the project. Each emission source receives a separate permit number, S-1 through S-5. These are:

S-1 Combustion Gas Turbine #1, General Electric LM6000 PC SPRINT; 473.7 MM BTU per hour, equipped with water injection, abated by A-1 SCR and A-2 Oxidation Catalyst

S-2 Heat Recovery Steam Generator #1, equipped with low emission Duct Burners, 136.9 MM BTU per hour, abated by A-1 SCR and A-2 Oxidation Catalyst

S-3 Combustion Gas Turbine #2, General ElectricLM6000 PC SPRINT); 473.7 MM BTU per hour, equipped with water injection, abated by A-3 SCR and A-4 Oxidation Catalyst

S-4 Heat Recovery Steam Generator #2, equipped with low emission Duct Burners, 136.9MM BTU per hour, abated by A-3 SCR and A-4 Oxidation Catalyst

S-5 Cooling Tower, 3-Cell, 34,980 gallons per minute capacity, equipped with High Efficiency Drift Eliminators

Conditions AQ-1 through AQ-12 shall only apply during the commissioning period. Unless otherwise indicated, Conditions AQ-13 through AQ-47 shall apply after the commissioning period has ended. For definitions of the technical terms in Conditions AQ-13 through AQ-47, the reader is referred to the BAAQMD's Preliminary Determination of Compliance for the Pico Power Project.

CONDITIONS FOR THE COMMISSIONING PERIOD

AQ-1 The owner/operator of PPP shall minimize emissions of carbon monoxide and nitrogen oxides from S-1, S-3 Gas Turbines and S-2, S-4 Heat Recovery Steam Generators (HRSGs) to the maximum extent possible during the commissioning period.

Verification: The project owner/operator shall propose a schedule of compliance with this Condition of Certification in the Commissioning Plan required by condition **AQ-5** and document continuing compliance with this Condition of Certification in each Monthly Emissions Report required by condition **AQ-11**.

AQ-2 At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall tune the S-1, S-3 Gas Turbine combustors and S-2, S-4 Heat Recovery Steam Generator duct burners to minimize the emissions of carbon monoxide and nitrogen oxides.

Verification: The project owner/operator shall propose a schedule of compliance with this Condition of Certification in the Commissioning Plan required by condition **AQ-5** and document continuing compliance with this Condition of Certification in each Monthly Emissions Report required by condition **AQ-11**.

AQ-3 At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall install, adjust, and operate the A-1, A-3 SCR Systems and A-2, A-4 Oxidation Catalysts to minimize the emissions of carbon monoxide and nitrogen oxides from S-1, S-3 Gas Turbines, S-2, S-4 Heat Recovery Steam Generators.

Verification: The project owner/operator shall propose a schedule of compliance with this Condition of Certification in the Commissioning Plan required by condition **AQ-5** and document continuing compliance with this Condition of Certification in each Monthly Emissions Report required by condition **AQ-11**.

AQ-4 Coincident with the steady-state operation of A-2, A-4 Oxidation Catalysts and A-1, A-3 SCR Systems pursuant to conditions **AQ-3**, **AQ-8**, and **AQ-9** the owner/operator shall operate the Gas Turbines (S-1, S-3) and the HRSGs (S-2, S-4) in such a manner as to comply with the NO_x and CO emission limitations specified in conditions **AQ-20(a)** through **AQ-20(d)**.

Verification: Coincident with the as-designed operation of A-1 and A-2 SCR Systems, pursuant to conditions **AQ-3**, **AQ-10**, **AQ-11**, and **AQ-12**, the Gas Turbines (S-1 and S-3) and the HRSGs (S-2 and S-4) the owner/operator shall operate the facility in a manner such that comply with the NO_x and CO emission limitations specified in conditions **AQ-20(a)** through **AQ-20(d)**.

AQ-5 The owner/operator of Pico Power Plant shall submit a plan to the District Permit Services Division and the CEC Compliance Program Manager (CPM) at least four weeks prior to first firing of S-1 or S-3 Gas Turbines describing the procedures to be followed during the commissioning of the turbines, HRSGs, and steam turbine. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the tuning of the water injection system, the installation and operation of the required emission control systems, the installation, calibration, and testing of the CO and NO_x continuous emission monitors, and any activities requiring the firing of the Gas Turbines (S-1, S-3), HRSGs (S-2, S-4), without abatement by their respective Oxidation Catalysts and/or SCR Systems. The owner/operator shall not fire any of the Gas Turbines (S-1, S-3) sooner than 28 days after the District receives the commissioning plan.

Verification: The project owner/operator shall submit a Commissioning Plan to the District Permit Services Division and the CPM for approval at least four (4) weeks prior to first fire of S-1, S-2, S-3 and S-4.

AQ-6 During the commissioning period, the owner/operator of Pico Power Plant shall demonstrate compliance with conditions **AQ-10** and **AQ-11** through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:

- firing hours
- fuel flow rates
- stack gas nitrogen oxide emission concentrations,
- stack gas carbon monoxide emission concentrations
- stack gas oxygen concentrations.

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the Gas Turbines (S-1, S-3), and HRSGs (S-2, S-4). The owner/operator shall use District-approved methods to calculate heat input rates, nitrogen dioxide mass emission rates, carbon monoxide mass emission rates, and NO_x and CO emission concentrations, summarized for each clock hour and each calendar day. The owner/operator shall retain records on site for at least 5 years from the date of entry and make such records available to District personnel upon request.

Verification: The project owner/operator shall propose a schedule of compliance with this Condition of Certification in the Commissioning Plan required by condition **AQ-5** and document continuing compliance with this Condition of Certification in each Monthly Emissions Report required by condition **AQ-11**.

AQ-7 The owner/operator shall install, calibrate, and operate the District-approved continuous monitors specified in condition **AQ-6** prior to first firing of the Gas Turbines (S-1, S-3), and Heat Recovery Steam Generators (S-2, S-4). After first firing of the

gas turbines, the owner/operator shall adjust the detection range of these continuous emission monitors as necessary to accurately measure the resulting range of CO and NO_x emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval.

Verification: The project owner/operator shall notify the District and CPM of the date of expected first fire at least 30 days prior to first fire and shall make the project site available for inspection if desired by either the District or CPM. The project owner/operator shall propose a schedule of compliance with this Condition of Certification in the Commissioning Plan required by condition **AQ-5** and document continuing compliance with this Condition of Certification in each Monthly Emissions Report required by condition **AQ-11**.

AQ-8 The owner/operator shall not fire the S-1 Gas Turbine and S-2 Heat Recovery Steam Generator without abatement of nitrogen oxide emissions by A-1 SCR System and/or abatement of carbon monoxide emissions by A-2 Oxidation Catalyst for more than 300 hours during the commissioning period. Such operation of S-1 Gas Turbine and S-2 HRSG without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system and/or oxidation catalyst in place. Upon completion of these activities, the owner/operator shall provide written notice to the District Permit Services and Enforcement Divisions and the unused balance of the 300 firing hours without abatement shall expire.

Verification: The project owner/operator shall submit documentation of compliance with this Condition of Certification in the Monthly Emissions Report required by condition **AQ-11**.

AQ-9 The owner/operator shall not fire the S-3 Gas Turbine and S-4 Heat Recovery Steam Generator without abatement of nitrogen oxide emissions by A-3 SCR System and/or abatement of carbon monoxide emissions by A-4 Oxidation Catalyst for more than 300 hours during the commissioning period. Such operation of S-3 Gas Turbine and S-4 HRSG without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system and/or oxidation catalyst in place. Upon completion of these activities, the owner/operator shall provide written notice to the District Permit Services and Enforcement Divisions and the unused balance of the 300 firing hours without abatement shall expire.

Verification: The project owner/operator shall submit documentation of compliance with this Condition of Certification in the Monthly Emissions Report required by condition **AQ-11**.

AQ-10 The total mass emissions of nitrogen oxides, carbon monoxide, precursor organic compounds, PM10, and sulfur dioxide that are emitted by the Gas Turbines (S-1, S-3), and Heat Recovery Steam Generators (S-2, S-4), and S-5 Cooling Tower during the commissioning period shall accrue towards the consecutive 12-month emission limitations specified in condition **AQ-23**.

Verification: The project owner/operator shall submit documentation of compliance with this Condition of Certification in the Monthly Emissions Report required by condition **AQ-11**.

AQ-11 The owner/operator shall not operate the Gas Turbines (S-1, S-3) and Heat Recovery Steam Generators (S-2, S-4) in a manner such that the combined pollutant emissions from these sources will exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the Gas Turbines (S-1, S-3).

NO_x (as NO2)	396.0 pounds per calendar day	18 pounds per hour
CO	423.7 pounds per calendar day	45 pounds per hour
POC (as CH4)	82.4 pounds per calendar day	
PM10	209.9 pounds per calendar day	
SO2	19.5 pounds per calendar day	

Verification: During the Commissioning Period, as defined in the district FDOC, the project owner/operator shall submit to the CPM for approval, a Monthly Emissions Report that includes, but is not limited to, fuel use, turbine operation, post combustion control operation, ammonia use and CEM readings on an hourly and daily basis. The Monthly Emissions Report for each month must be submitted by the 15th (or the following Monday if the 15th is a Saturday or Sunday) of the following month.

AQ-12 Prior to the end of the Commissioning Period, the Owner/Operator shall conduct a District and CEC approved source test using external continuous emission monitors to determine compliance with the limitations specified in condition **AQ-21**. The source test shall determine NOx, CO, and POC emissions during start-up and shutdown of the gas turbines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. The source test shall include a minimum of three start-up and three shutdown periods. Thirty working days before the execution of the source tests, the Owner/Operator shall submit to the District and the CEC Compliance Program Manager (CPM) a detailed source test plan designed to satisfy the requirements of this condition. The District and the CEC CPM will notify the Owner/Operator of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CEC CPM comments into the test plan. The Owner/Operator shall notify the District and the CEC CPM within 7 working days prior to the planned source testing date. Source test results shall be submitted to the District and the CEC CPM within 60 days of the source testing date.

Verification: No later than 20 working days before the execution of the source tests, the Owner/Operator shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. The District and the CPM will notify the Owner/Operator of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CPM comments into the test plan. The Owner/Operator shall notify the District and the CPM within 7 working days prior to the planned source testing date. Source test results shall be submitted to the District and the CPM within 30 days of the source testing date.

CONDITIONS FOR THE GAS TURBINES (S-1, S-3) AND THE HEAT RECOVERY STEAM GENERATORS (HRSGS; S-2, S-4)

AQ-13 The owner/operator shall fire the Gas Turbines (S-1, S-3) and HRSG Duct Burners (S-2, S-4) exclusively with natural gas. (BACT for SO_2 and PM10)

Verification: A detailed report of fuel use and equipment operation shall be included in the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-14 The owner/operator shall not operate the units such that the combined heat input rate to each power train consisting of a Gas Turbine and its associated HRSG (S-1 and S-

2, S-3 and S-4) exceeds 610.6 MM BTU (HHV) per hour, averaged over any rolling 3-hour period.

Verification: A detailed report of fuel use and equipment operation shall be included in the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-15 The owner/operator shall not operate the units such that the combined heat input rate to each power train consisting of a Gas Turbine and its associated HRSG (S-1 and S-2, S-3 and S-4) exceeds 13,559.2 MM BTU (HHV) per calendar day.

Verification: A detailed report of fuel use and equipment operation shall be included in the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-16 The owner/operator shall not operate the units such that the combined cumulative heat input rate for the Gas Turbines (S-1, S-3) and the HRSGs (S-2, S-4) exceeds 8,682,544 MM BTU (HHV) per year.

Verification: A detailed report of fuel use and equipment operation shall be included in the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-17 The owner/operator shall not fire the HRSG duct burners (S-2, S-4) unless its associated Gas Turbine (S-1, S-3 respectively) is in operation.

Verification: The project owner/operator shall make the project site available for inspection at any time by representatives of the District, ARB, U.S. EPA and CEC.

AQ-18 The owner/operator shall ensure that the S-1 Gas Turbine and S-2 HRSG are abated by the properly operated and properly maintained A-1 Selective Catalytic Reduction (SCR) System whenever fuel is combusted at those sources and the A-1 SCR catalyst bed has reached minimum operating temperature. (BACT for NO_x)

Verification: The project owner/operator shall make the project site available for inspection at any time by representatives of the District, ARB, U.S. EPA and CEC.

AQ-19 The owner/operator shall ensure that the S-3 Gas Turbine and S-4 HRSG are abated by the properly operated and properly maintained A-3 Selective Catalytic Reduction (SCR) System whenever fuel is combusted at those sources and the A-3 SCR catalyst bed has reached minimum operating temperature. (BACT for NO_x)

Verification: The project owner/operator shall make the project site available for inspection at any time by representatives of the District, ARB, U.S. EPA and CEC.

AQ-20 The owner/operator shall ensure that the Gas Turbines (S-1and S-3) and HRSGs (S-2 and S-4) comply with requirements (a) through (h) under all operating scenarios, including duct burner firing mode and power augmentation mode. Requirements (a) through (h) do not apply during a gas turbine start-up or shutdown. (BACT and Toxic Risk Management Policy)

(a) Nitrogen oxide mass emissions (calculated as NO_2) at P-1 (the combined exhaust point for S-1 Gas Turbine and S-2 HRSG after abatement by A-1 SCR System) shall not exceed 4.49 pounds per hour or 0.0074 lb/MM BTU (HHV) of natural gas fired. Nitrogen oxide mass emissions (calculated as NO_2) at P-2 (the combined exhaust point for S-3 Gas Turbine and S-4 HRSG after abatement by A-3 SCR System) shall not exceed 4.49 pounds per hour or 0.0074 lb/MM BTU (HHV) of natural gas fired.

(b) The nitrogen oxide emission concentration at emission points P-1 and P-2 each shall not exceed 2.0 ppmv, on a dry basis, corrected to 15 percent O_2, averaged over any 1-hour period. (BACT for NO_x)

(c) Carbon monoxide mass emissions at P-1 and P-2 each shall not exceed 5.47 pounds per hour or 0.00896 lb/MM BTU of natural gas fired, averaged over any rolling 3-hour period.

(d) The carbon monoxide emission concentration at P-1 and P-2 each shall not exceed 4.0 ppmv, on a dry basis, corrected to 15 percent O_2, averaged over any rolling 3-hour period. (BACT for CO)

(e) Ammonia (NH_3) emission concentrations at P-1and P-2 each shall not exceed 10 ppmv, on a dry basis, corrected to 15 percent O_2, averaged over any rolling 3-hour period. This ammonia emission concentration shall be verified by the continuous recording of the ammonia injection rate to A-1 and A-3 SCR Systems. The correlation between the gas turbine and HRSG heat input rates, A-1 and A-3 SCR System ammonia injection rates, and corresponding ammonia emission concentration at emission points P-1 and P-2 shall be determined in accordance with permit condition **AQ-30**. (TRMP for NH_3)

(f) Precursor organic compound (POC) mass emissions (as CH_4) at P-1 and P-2 each shall not exceed 1.6 pounds per hour or 0.00262 lb/MM BTU of natural gas fired. (BACT for POC)

(g) Precursor organic compound (POC) mass emissions (as CH_4) at P-1 and P-2 each shall not exceed 2.0 ppmv, on a dry basis, corrected to 15 percent O_2 , averaged over any rolling 3-hour period. (BACT for POC)

(h) Sulfur dioxide (SO_2) mass emissions at P-1 and P-2 each shall not exceed 0.41 pounds per hour or 0.000676 lb/MM BTU of natural gas fired. (BACT for SO_2)

(i) Particulate matter (PM10) mass emissions at P-1and P-2 each shall not exceed 3.0 pounds per hour when the HRSG duct burners are not in operation. Particulate matter (PM10) mass emissions at P-1 and P-2 each shall not exceed 4.3 pounds per hour when HRSG duct burners are in operation. (BACT for PM10)

Compliance with the hourly NO_x emission limitations specified in condition **AQ-25(a)** and **AQ-25(b)**, at both P1 and P2, shall not be required during short-term excursions, limited to a cumulative total of 160 hours per rolling 12 month period. Short-term excursions are defined as 15-minute periods designated by the owner/operator that are the direct result of transient load conditions, not to exceed four consecutive 15-minute periods, when the 15-minute average NO_x concentration exceeds 2.0 ppmv, dry @ 15 percent O_2. Examples of transient load conditions include, but are not limited to the following:

(1) Initiation/shutdown of combustion turbine inlet air cooling
(2) Initiation/shutdown of combustion turbine steam injection for power augmentation
(3) Rapid combustion turbine load changes
(4) Initiation/shutdown of HRSG duct burners

(5) Provision of Ancillary Services and Automatic Generation Control at the direction of the California Independent System Operator (Cal-ISO)

The maximum 1-hour average NO_x concentration for short-term excursions at P-1 and P-2 each shall not exceed *5* ppmv, dry @ 15 percent O_2 *or 11 lb/hr (2.75 lb per 15 minute period)*. All emissions during short-term excursions shall be included in all calculations of hourly, daily and annual mass emission rates as required by this permit.

Verification: The project owner/operator shall submit documentation of compliance with all emission limits specified in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-21 The owner/operator shall ensure that the regulated air pollutant mass emission rates from each of the Gas Turbines (S-1, S-3) during a start-up or a shutdown does not exceed the limits established below.

	Start-Up (lb/hr)	Shutdown (lb/hr)
Oxides of Nitrogen (as NO_2)	41	8
Carbon Monoxide (CO)	35	10
Precursor Organic Compounds (as CH_4)	3	3

Verification: The project owner/operator shall submit documentation of compliance with the emission limits in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

Conditions for All Sources

AQ-22 The owner/operator shall not allow total combined emissions from the Gas Turbines and HRSGs (S-1, S-2, S-3, S-4), and S-5 Cooling Tower, including emissions generated during Gas Turbine start-ups and shutdowns to exceed the following limits during any calendar day:

(a) 396.0 pounds of NO_x (as NO_2) per day
(b) 423.68 pounds of CO per day
(c) 82.4 pounds of POC (as CH_4) per day
(d) 209.94 pounds of PM10 per day
(e) 19.52 pounds of SO_2 per day

Verification: The project owner/operator shall submit documentation of compliance with all emission limits specified in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-23 The owner/operator shall not allow cumulative combined emissions from the Gas Turbines and HRSGs (S-1, S-2, S-3, S-4), and S-5 Cooling Tower, including emissions generated during gas turbine start-ups and shutdowns to exceed the following limits during any consecutive twelve-month period:

(a) 45.0 tons of NO_x (as NO_2) per year (Offsets)
(b) 49.5 tons of CO per year
(c) 11.53 tons of POC (as CH_4) per year
(d) 30.4 tons of PM10 per year
(e) 2.93 tons of SO_2 per year

Verification: The project owner/operator shall submit documentation of compliance with all emission limits specified in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-24 The owner/operator shall not allow the combined heat input rate to the Gas Turbines and HRSGs (S-1, S-2, S-3, S-4) to exceed 27,118.4 million BTU per calendar day.

Verification: A detailed report of fuel use and equipment operation shall be included in the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-25 The owner/operator shall not allow the cumulative heat input rate to the Gas Turbines and HRSGs (S-1, S-2, S-3, S-4) combined to exceed 8,682,544.0 million BTU per year.

Verification: A detailed report of fuel use and equipment operation shall be included in the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-26 The owner/operator shall not allow the maximum projected annual toxic air contaminant emissions (per condition **AQ-29**) from the Gas Turbines and HRSGs (S-1, S-2, S-3, S-4) combined to exceed the following limits:

acetaldehyde	1,155	pounds per year
formaldehyde	2,706	pounds per year
benzene	112	pounds per year

Specified PAHs 0.71 pound per year

unless the following requirement is satisfied:

The owner/operator shall perform a health risk assessment to determine the total facility risk using the emission rates determined by source testing and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. This risk analysis shall be submitted to the District and the CEC Compliance Program Manager (CPM) within 60 days of the source test date. The owner/operator may request that the District and the CEC CPM revise the carcinogenic compound emission limits specified above. If the owner/operator demonstrates to the satisfaction of the APCO that these revised emission limits will not result in a significant cancer risk, the District and the CEC CPM may, at their discretion, adjust the carcinogenic compound emission limits listed above. (TRMP)

Verification: If prepared, the health risk analysis shall be submitted to the District and the CPM within 60 days of the source test date. Otherwise, the project owner/operator shall submit documentation of compliance with all emission limits specified in this Condition of Certification as part of the January 30 Quarterly Air Quality Report each year required by the verification of condition **AQ-34**.

AQ-27 The owner/operator shall demonstrate compliance with conditions **AQ-14** through **AQ-17**, **AQ-20(a)** through **AQ-20(d)**, **AQ-21**, **AQ-22(a)**, **AQ-22(b)**, **AQ-23(a)**, and **AQ-23(b)** by using properly operated and maintained continuous monitors (during all hours of operation including equipment Start-up and Shutdown periods) for all of the following parameters:

(a) Firing Hours and Fuel Flow Rates for each of the following sources: S-1 and S-2 combined, S-3 and S-4 combined.

(b) Oxygen (O_2) Concentration, Nitrogen Oxides (NO_x) Concentration, and Carbon Monoxide (CO) Concentration at each of the following exhaust points: P-1and P-2.
Ammonia injection rate at A-1and A-3 SCR Systems
Any transient load conditions recorded in **AQ-27(a)** above and as described in **AQ-20(j)** shall be fully characterized and recorded on a quarter hour (15-minute period) basis.

(c) The owner/operator shall record all of the above parameters every 15 minutes (excluding normal calibration periods) and shall summarize all of the above parameters for each clock hour. For each calendar day, the owner/operator shall calculate and record the total firing hours, the average hourly fuel flow rates, and pollutant emission concentrations.

(d) The owner/operator shall use the parameters measured above and District-approved calculation methods to calculate the following parameters:

(e) Heat Input Rate for each of the following sources: S-1 and S-2 combined, S-3 and S-4 combined.

(f) Corrected NO_x concentration, NO_x mass emission rate (as NO_2), corrected CO concentration, and CO mass emission rate at each of the following exhaust points: P-1 and P-2.

For each source, source grouping, or exhaust point, the owner/operator shall record the parameters specified in conditions **AQ-27(e)** and **AQ-27(f)** at least once every 15 minutes (excluding normal calibration periods). As specified below, the owner/operator shall calculate and record the following data:

(a) Total Heat Input Rate for every clock hour and the average hourly Heat Input Rate for every rolling 3-hour period.
(b) On an hourly basis, the cumulative total Heat Input Rate for each calendar day for the following: each Gas Turbine and associated HRSG combined and all four sources (S-1, S-2, S-3, and S-4) combined.
(c) The average NO_x mass emission rate (as NO_2) and corrected NO_x emission concentration for every clock hour and for every quarter hour (15-minute) period.
(d) The average CO mass emission rate and corrected CO emission concentration for every clock hour and for every rolling 3-hour period.
(e) On an hourly basis, the cumulative total NO_x mass emissions (as NO_2) and the cumulative total CO mass emissions, for each calendar day for each Gas Turbine and associated HRSG combined, and all four sources (S-1, S-2, S-3, S-4) combined.
(f) For each calendar day, the average hourly Heat Input Rates, Corrected NO_x emission concentration, NO_x mass emission rate (as NO_2), corrected CO emission concentration, and CO mass emission rate for each Gas Turbine and associated HRSG combined
(g) On a daily basis, the cumulative total NO_x mass emissions (as NO_2) and cumulative total CO mass emissions, for the previous consecutive twelve month period for all four sources (S-1, S-2, S-3, S-4) combined.

(Regulation 1-520.1, 9-9-501, BACT, NSPS, Cumulative Increase)

Verification: The project owner/operator shall submit documentation of each of the parameters specified in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-28 To demonstrate compliance with conditions **AQ-20(f)**, **AQ-20(g)**, **AQ-20(h)**, **AQ-20(i)**, **AQ-21**, **AQ-22(c)** through **AQ-22(e)**, and **AQ-23(c)** through **AQ-23(e)**, the owner/operator shall calculate and record on a daily basis, the Precursor Organic Compound (POC) mass emissions, Fine Particulate Matter (PM10) mass emissions (including condensable particulate matter), and Sulfur Dioxide (SO_2) mass emissions from each power train. The owner/operator shall use the actual Heat Input Rates calculated pursuant to condition **AQ-27**, actual Gas Turbine Start-up Times, actual Gas Turbine Shutdown Times, and CEC and District-approved emission factors to calculate these emissions. The calculated emissions shall be presented as follows:

(a) For each calendar day, POC, PM10, and SO_2 emissions shall be summarized for: each power train (Gas Turbine and its respective HRSG combined) and all four sources (S-1, S-2, S-3, S-4) combined.
(b) on a daily basis, the cumulative total POC, PM10, and SO_2 mass emissions, for each year for all four sources (S-1, S-2, S-3, S-4) combined.

(Offsets, Cumulative Increase)

Verification: The project owner/operator shall submit documentation of each of the parameters specified in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-29 To demonstrate compliance with Condition **AQ-26**, the owner/operator shall calculate and record on an annual basis the maximum projected annual emissions of: Formaldehyde, Benzene, and Specified PAH's. Maximum projected annual emissions shall be calculated using the maximum Heat Input Rate of 8,682,544 MM BTU/year and the highest emission factor (pounds of pollutant per MM BTU of heat input) determined by any source test of the S-1 and S-3 Gas Turbines and/or S-2 and S-4 Heat Recovery Steam Generators. If the highest emission factor for a given pollutant occurs during minimum-load turbine operation, a reduced annual heat input rate may be utilized to calculate the maximum projected annual emissions to reflect the reduced heat input rates during gas turbine start-up and minimum-load operation. The reduced annual heat input rate shall be subject to District review and approval. (TRMP).

Verification: The project owner/operator shall submit documentation of each of the parameters specified in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-30 Within 60 days of start-up of the Pico Power Plant, the owner/operator shall conduct a District-approved source test on exhaust point P-1 or P-2 to determine the corrected ammonia (NH_3) emission concentration to determine compliance with condition **AQ-20(e)**. The source test shall determine the correlation between the heat input rates of the gas turbine and associated HRSG, A-1, and A-3 SCR System ammonia injection rate, and the corresponding NH_3 emission concentration at emission point P-1 or P-2. The source test shall be conducted over the expected operating range of the turbine and HRSG (including, but not limited to, minimum and full load, and SPRINT power augmentation mode) to establish the range of ammonia injection rates necessary to achieve NO_x emission reductions while maintaining ammonia slip levels. Source testing shall be repeated on an annual basis thereafter. Ongoing compliance with condition **AQ-20(e)** shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate. Source test results shall be submitted to the District and the CEC Compliance Program Manager within 90 days of conducting the tests. (TRMP)

Verification: Initial source testing shall be completed within 60 days of start-up. No later than 20 working days before the execution of the source tests, the Owner/Operator shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. The District and the CPM will notify the Owner/Operator of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CPM comments into the test plan. The Owner/Operator shall notify the District and the CPM within 7 working days prior to the planned source testing date. Source test results shall be submitted to the District and the CPM within 60 days of the source testing date.

AQ-31 Within 90 days of start-up of the Pico Power Plant and on an annual basis thereafter, the owner/operator shall conduct a District-approved source test on exhaust points P-1and P-2 while each Gas Turbine and associated Heat Recovery Steam Generator are operating at maximum load (including SPRINT power augmentation mode) to

determine compliance with Conditions **AQ-20(a)**, **(b)**, **(c)**, **(d)**, **(f)**, **(g)**, and **(h)**, while each Gas Turbine and associated Heat Recovery Steam Generator are operating at minimum load to determine compliance with Conditions **AQ-20(c)** and **(d)**, and to verify the accuracy of the continuous emission monitors required in condition **AQ-27**. The owner/operator shall test for (at a minimum): water content, stack gas flow rate, oxygen concentration, precursor organic compound concentration and mass emissions, nitrogen oxide concentration and mass emissions (as NO_2), carbon monoxide concentration and mass emissions, sulfur dioxide concentration and mass emissions, methane, ethane, and particulate matter (PM10) emissions including condensable particulate matter. Source test results shall be submitted to the District and the CEC Compliance Program Manager within 60 days of conducting the tests. (BACT)

Verification: Initial source testing shall be completed within 60 days of start-up. No later than 20 working days before the execution of the source tests, the Owner/Operator shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. The District and the CPM will notify the Owner/Operator of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CPM comments into the test plan. The Owner/Operator shall notify the District and the CPM within 7 working days prior to the planned source testing date. Source test results shall be submitted to the District and the CPM within 60 days of the source testing date.

AQ-32 The owner/operator shall obtain approval for all source test procedures from the District's Source Test Section and the CEC Compliance Program Manager (CPM) prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements for continuous emission monitors as specified in Volume V of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section and the CEC CPM in writing of the source test protocols and projected test dates at least 7 days prior to the testing date(s). As indicated above, the Owner/Operator shall measure the contribution of condensable PM (back half) to the total PM10 emissions. However, the Owner/Operator may propose alternative measuring techniques to measure condensable PM such as the use of a dilution tunnel or other appropriate method used to capture semi-volatile organic compounds. Source test results shall be submitted to the District and the CEC CPM within 60 days of conducting the tests. (BACT)

Verification: The project owner/operator shall submit documentation of the procedures and results of each source test conducted as part of the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-33 Within 90 days of start-up of the PPP, the owner/operator shall conduct a District-approved source test on exhaust point P-1 or P-2 while the Gas Turbine and associated Heat Recovery Steam Generator are operating at maximum allowable operating rates to demonstrate compliance with Condition **AQ-26**. (TRMP)

Verification: Initial source testing shall be completed within 60 days of start-up. No later than 20 working days before the execution of the source tests, the Owner/Operator shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. The District and the CPM will notify the Owner/Operator of

any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CPM comments into the test plan. The Owner/Operator shall notify the District and the CPM within 7 working days prior to the planned source testing date. Source test results shall be submitted to the District and the CPM within 60 days of the source testing date.

AQ-34 The owner/operator of the Pico Power Plant shall submit all reports (including, but not limited to monthly CEM reports, monitor breakdown reports, emission excess reports, equipment breakdown reports, etc.) as required by District Rules or Regulations and in accordance with all procedures and time limits specified in the Rule, Regulation, Manual of Procedures, or Enforcement Division Policies and Procedures Manual. (Regulation 2-6-502)

Verification: The project owner/operator shall submit a Quarterly Air Quality Report (QAQR) for the preceding calendar quarter by January 30, April 30, July 30 and October 30 of each year. Each QAQR shall include, but not be limited to, a compliance matrix, a summary of operations activities, and a summary of all reports covered by this condition. The January 30 report for each year shall include an annual summary of the four Quarterly Air Quality Reports covering the preceding calendar year. The QAQR shall be submitted to the California Energy Commission Compliance Project Manager (CPM).

AQ-35 The owner/operator of the Pico Power Plant shall maintain all records and reports on site for a minimum of 5 years. These records shall include but are not limited to: continuous monitoring records (firing hours, fuel flows, emission rates, monitor excesses, breakdowns, etc.), source test and analytical records, natural gas sulfur content analysis results, emission calculation records, records of plant upsets and related incidents. The owner/operator shall make all records and reports available to District and the CEC Compliance Program Manager staff upon request. (Regulation 2-6-501)

Verification: The project owner/operator shall maintain a copy of each Quarterly Air Quality Report on site for a minimum of 5 years.

AQ-36 The owner/operator of the Pico Power Plant shall notify the District and the CEC Compliance Program Manager of any violations of these permit conditions. Notification shall be submitted in a timely manner, in accordance with all applicable District Rules, Regulations, and the Manual of Procedures. Notwithstanding the notification and reporting requirements given in any District Rule, Regulation, or the Manual of Procedures, the owner/operator shall submit written notification (facsimile is acceptable) to the Enforcement Division within 96 hours of the violation of any permit condition. (Regulation 2-1-403)

Verification: The owner/operator shall include a compliance matrix in the Quarterly Air Quality Report required by the verification of condition **AQ-34**. The Compliance Matrix shall summarizing the project's compliance status for each condition during the reporting period.

AQ-37 The owner/operator shall ensure that the stack height of emission points P-1 and P-2 is each at least 95 feet above grade level at the stack base. (TRMP)

Verification: Prior to the first firing of natural gas in either turbine the owner/operator shall provide as built drawings of the stack or other suitable proof of the minimum stack height to the District and the CPM.

AQ-38 The Owner/Operator of the Pico Power Plant shall provide adequate stack sampling ports and platforms to enable the performance of source testing. The location and configuration of the stack sampling ports shall comply with the District Manual of Procedures, Volume IV, Source Test Policy and Procedures, and shall be subject to BAAQMD review and approval. (Regulation 1-501)

Verification: Prior to the first firing of natural gas in either turbine the owner/operator shall provide as built drawings of the stack or other suitable proof of the minimum stack height to the District and the CPM.

AQ-39 Within 180 days of the issuance of the Authority to Construct for the Pico Power Plant, the Owner/Operator shall contact the BAAQMD Technical Services Division regarding requirements for the continuous emission monitors, sampling ports, platforms, and source tests required by conditions **AQ-27**, **AQ-30**, **AQ-31**, **AQ-33**, and **AQ-45**. All source testing and monitoring shall be conducted in accordance with the BAAQMD Manual of Procedures. (Regulation 1-501)

Verification: The project owner/operator shall submit documentation of compliance with this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-40 Prior to the issuance of the BAAQMD Authority to Construct for the Pico Power Plant, the Owner/Operator shall demonstrate that valid emission reduction credits in the amount of 45.5 tons/year of Nitrogen Oxides (as defined by District Regulation 2-2-302) are under their control through enforceable contracts, option to purchase agreements, or equivalent binding legal documents. (Offsets)

Verification: The project owner/operator must submit all ERC documentation to the District and the CPM prior to the issuance of the BAAQMD Authority to Construct.

AQ-41 Prior to the start of construction of the Pico Power Plant, the Owner/Operator shall provide to the District valid emission reduction credit banking certificates in the amount of 45.5 tons/year of Nitrogen Oxides or equivalent as defined by District Regulations 2-2-302 and 2-2-302.2. (Offsets)

Verification: The project owner/operator must surrender all ERC certificates to the District and provide copies to the CPM prior to the start of construction.

AQ-42 Pursuant to BAAQMD Regulation 2, Rule 6, section 404.1, the owner/operator of the Pico Power Plant shall submit an application to the BAAQMD for a major facility review permit within 12 months of completing construction as demonstrated by the first firing of any gas turbine or HRSG duct burner. (Regulation 2-6-404.1)

Verification: The owner/operator shall notify the CPM within ten (10) working days of any application for, issuance of, and/or modification to any permit pertaining to air quality.

AQ-43 Pursuant to 40 CFR Part 72.30(b)(2)(ii) of the Federal Acid Rain Program, the owner/operator of the Pico Power Plant shall submit an application for a Title IV operating permit to the BAAQMD at least 24 months before operation of any of the gas turbines (S-1, S-3) or HRSGs (S-2, S-4). (Regulation 2, Rule 7)

Verification: The owner/operator shall notify the CPM within ten (10) working days of any application for, issuance of, and/or modification to any permit pertaining to air quality.

AQ-44 The Pico Power Plant shall comply with the continuous emission monitoring requirements of 40 CFR Part 75. (Regulation 2, Rule 7)

Verification: The project owner/operator shall submit documentation of compliance with this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

AQ-45 The owner/operator shall take monthly samples of the natural gas combusted at the Pico Power Plant. The samples shall be analyzed for sulfur content using District-approved laboratory methods. The sulfur content test results shall be retained on site for a minimum of five years from the test date and shall be utilized to satisfy the requirements of 40 CFR Part 60, subpart GG.

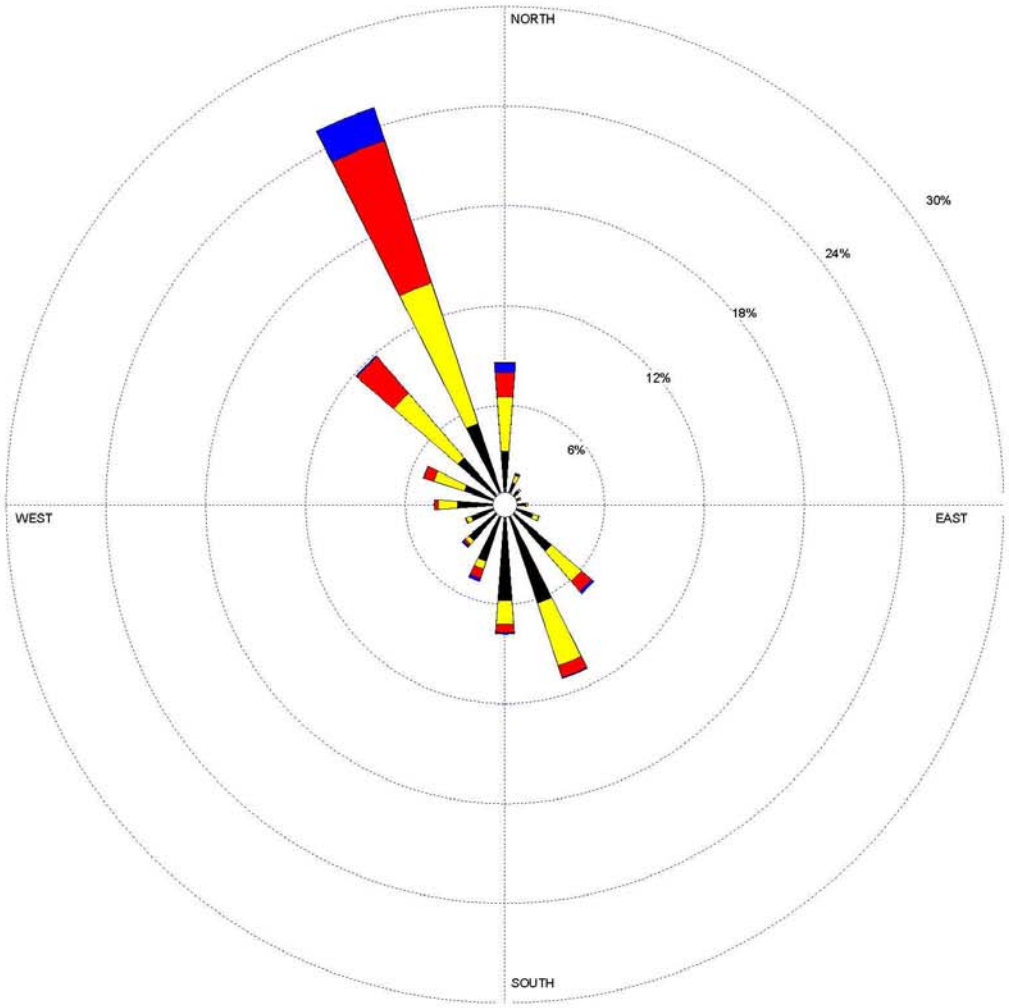
Verification: The project owner/operator shall submit documentation of compliance with this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of condition **AQ-34**.

APPENDIX A

Wind Rose Diagrams

WIND ROSE PLOT

San Jose Airport (1992-1995, 1997) – Annual

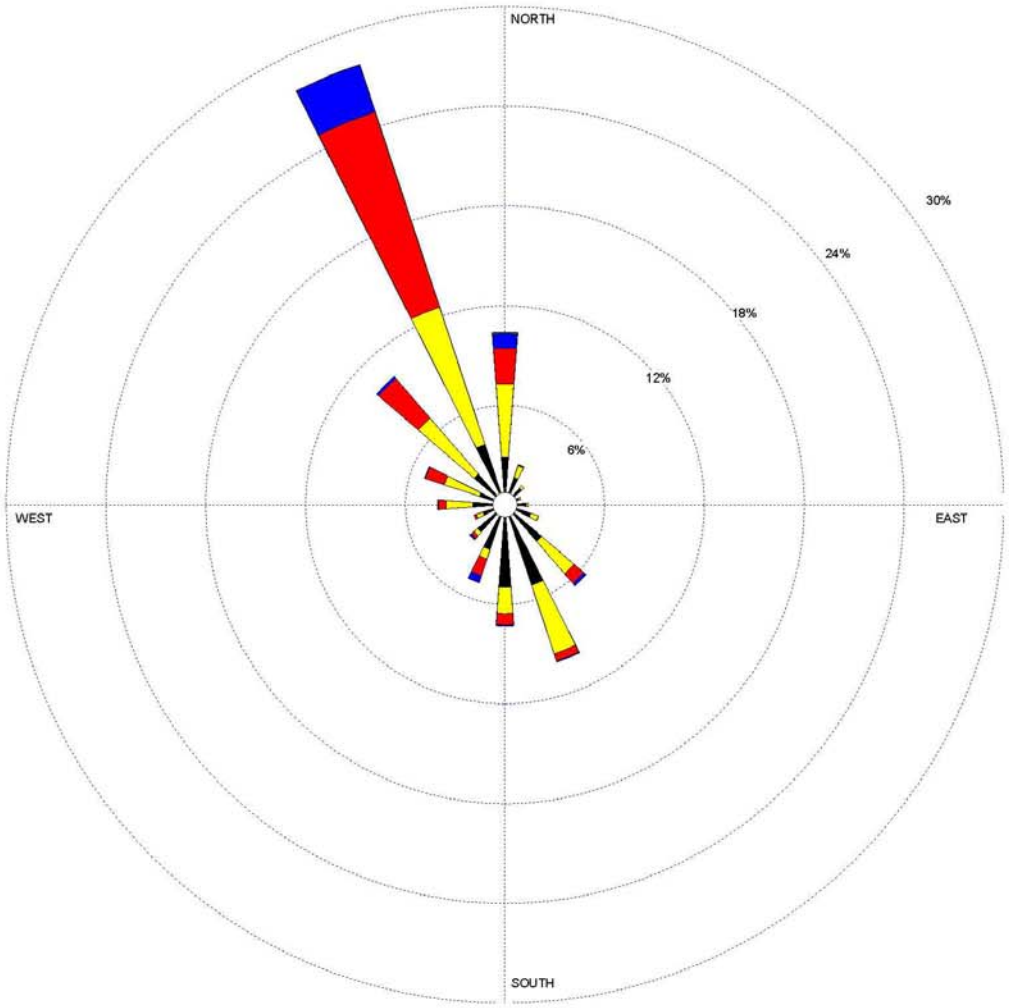


Wind Speed (Knots) > 21 17 - 21 11 - 16 7 - 10 4 - 6 1 - 3	MODELER **G.D. Taylor**	DATE **5/30/2003**	COMPANY NAME **California Energy Commission**
	DISPLAY **Wind Speed**	UNIT **Knots**	COMMENTS
	AVG. WIND SPEED **4.46 Knots**	CALM WINDS **0.38%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1992 1993 1994 1995 1997** **Jan 1 - Dec 31** **Midnight - 11 PM**	PROJECT NAME **Pico (Santa Clara)**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

San Jose Airport (1992-1995, 1997) – Spring

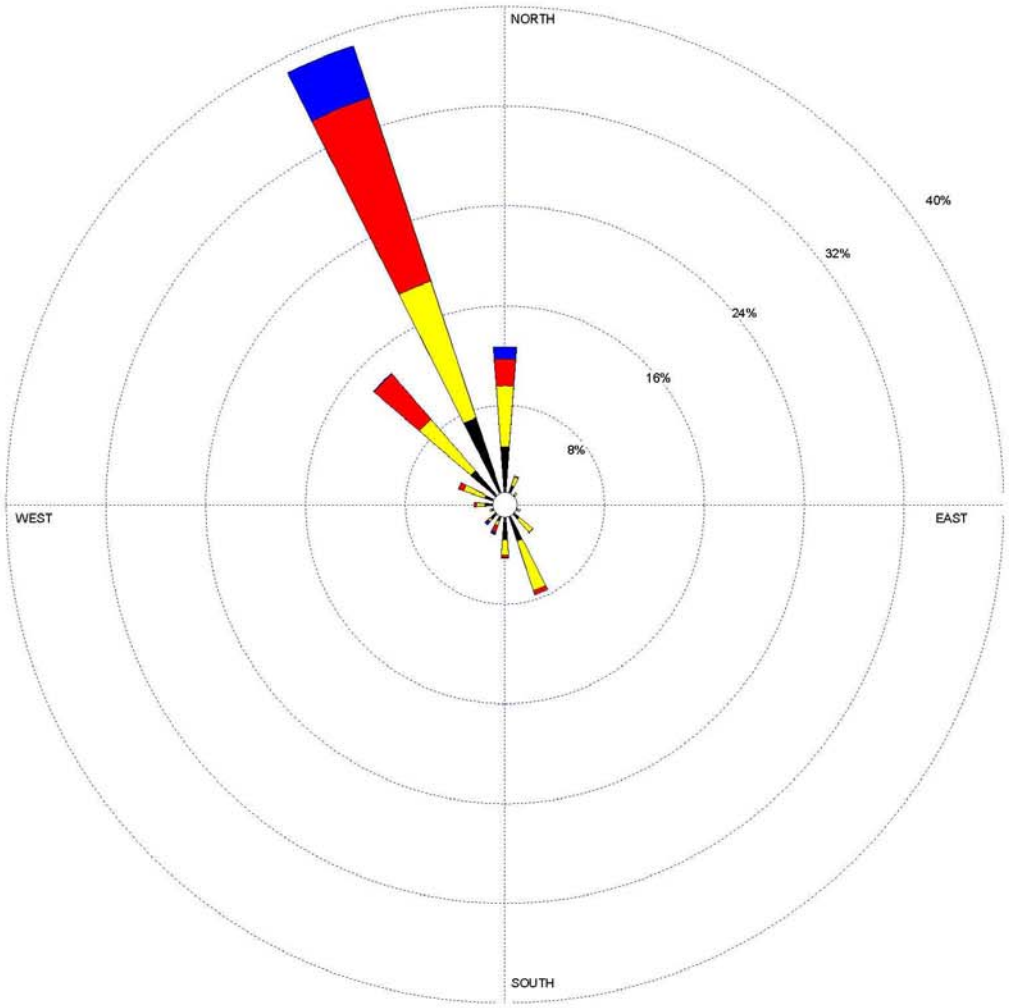


Wind Speed (Knots) > 21 17 - 21 11 - 16 7 - 10 4 - 6 1 - 3	MODELER **G.D. Taylor**	DATE **5/30/2003**	COMPANY NAME **California Energy Commission**
	DISPLAY **Wind Speed**	UNIT **Knots**	COMMENTS
	AVG. WIND SPEED **5.03 Knots**	CALM WINDS **0.16%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1992 1993 1994 1995 1997** **Mar 1 - May 31** **Midnight - 11 PM**	PROJECT NAME **Pico (Santa Clara)**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

San Jose Airport (1992-1995, 1997) – Summer



Wind Speed (Knots)

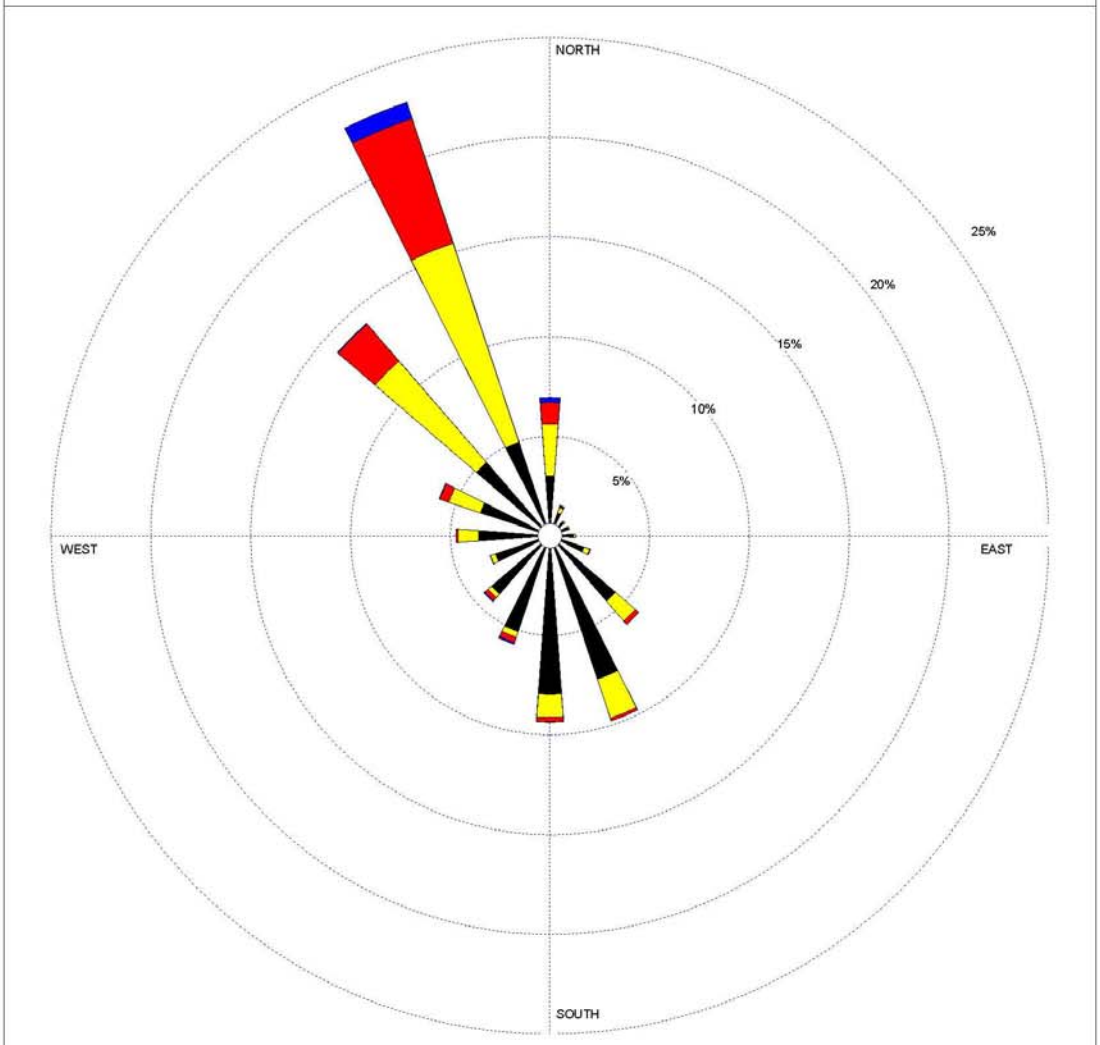
- > 21
- 17 - 21
- 11 - 16
- 7 - 10
- 4 - 6
- 1 - 3

MODELER **G.D. Taylor**	DATE **5/30/2003**	COMPANY NAME **California Energy Commission**
DISPLAY **Wind Speed**	UNIT **Knots**	COMMENTS
AVG. WIND SPEED **5.22 Knots**	CALM WINDS **0.21%**	
ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1992 1993 1994 1995 1997** **Jun 1 - Aug 31** **Midnight - 11 PM**	PROJECT NAME **Pico (Santa Clara)**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

San Jose Airport (1992-1995, 1997) – Fall



Wind Speed (Knots)

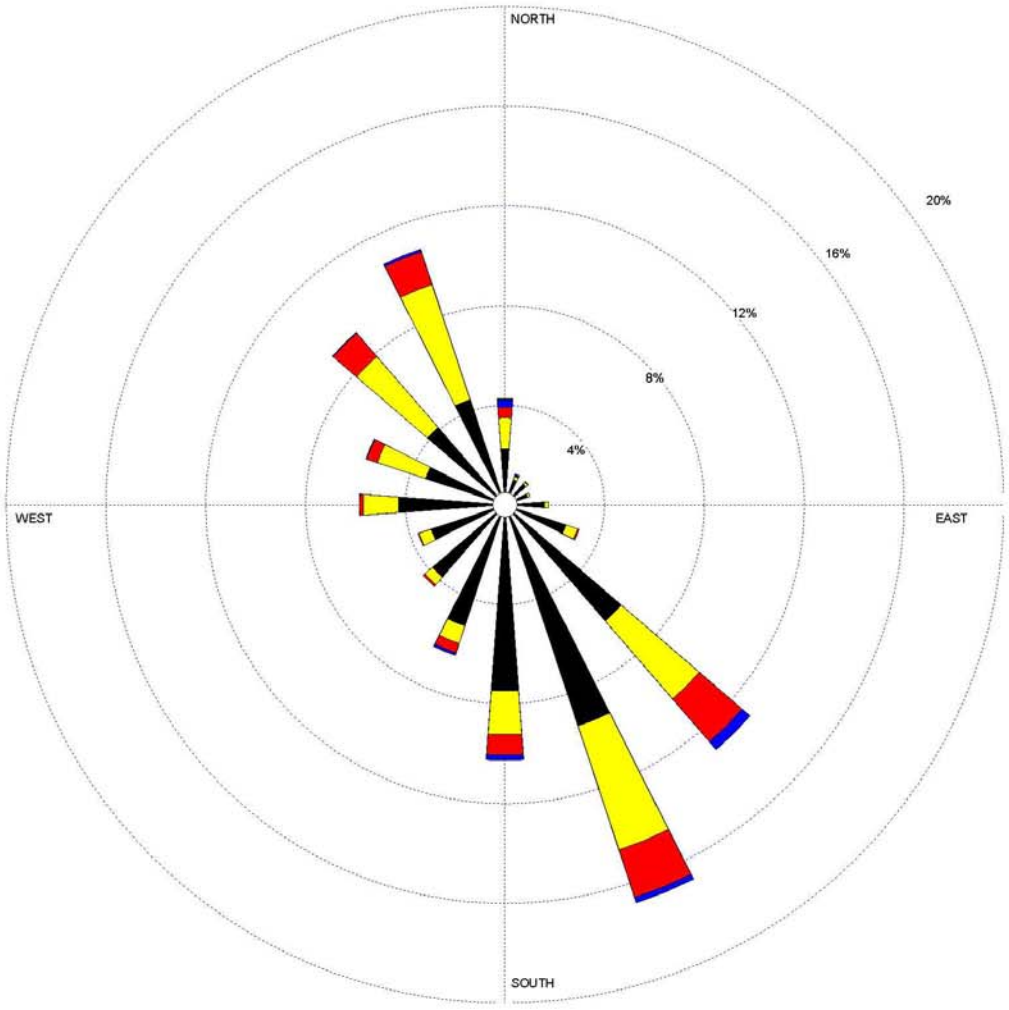
- > 21
- 17 - 21
- 11 - 16
- 7 - 10
- 4 - 6
- 1 - 3

MODELER **G.D. Taylor**	DATE **5/30/2003**	COMPANY NAME **California Energy Commission**
DISPLAY **Wind Speed**	UNIT **Knots**	COMMENTS
AVG. WIND SPEED **3.86 Knots**	CALM WINDS **0.05%**	
ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1992 1993 1994 1995 1997** **Sep 1 - Nov 30** **Midnight - 11 PM**	PROJECT NAME **Pico (Santa Clara)**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

San Jose Airport (1992-1995, 1997) – Winter



Wind Speed (Knots) > 21 17 - 21 11 - 16 7 - 10 4 - 6 1 - 3	MODELER **G.D. Taylor**	DATE **5/30/2003**	COMPANY NAME **California Energy Commission**
	DISPLAY **Wind Speed**	UNIT **Knots**	COMMENTS
	AVG. WIND SPEED **3.69 Knots**	CALM WINDS **1.11%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1992 1993 1994 1995 1997 Check Date Range Report Midnight - 11 PM**	PROJECT NAME **Pico (Santa Clara)**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

ACRONYMS

APCO	Air Pollution Control Officer
BAAQMD	Bay Area Air Quality Management District (District)
BACT	Best Available Control Technology
bhp	Brake Horse Power
CARB	California Air Resources Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO_2	Carbon Dioxide
CO	Carbon Monoxide
CPM	(CEC) Compliance Project Manager
DOC	Determination Of Compliance
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
FSA	Final Staff Analysis
gr	Grains (1 gr $\cong$ 0.0648 grams)
HRSG	Heat Recovery Steam Generator
ISCST3	Industrial Source Complex Short Term version 3
MW	Megawatt (1,000,000 Watts)
NH3	Ammonia
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
O_3	Ozone
PDOC	Preliminary Determination Of Compliance
PM10	Particulate Mater under 10 microns in diameter
POC	Precursor Organic Compounds
pphm	Parts Per Hundred Million
ppm	Parts Per Million
ppmv	Parts Per Million by Volume
ppmvd	Parts Per Million by Volume, Dry
PPP	Pico Power Project
PSD	Prevention of Significant Deterioration
SA	Staff Assessment (this document)
scf	Standard Cubic Feet
SCR	Selective Catalytic Reduction
SO_2	Sulfur Dioxide
SVP	Silicon Valley Power
U.S. EPA	United States Environmental Protection Agency

RESOURCES FOR FURTHER INFORMATION

California Energy Commission
http://www.energy.ca.gov/

California Energy Commission (Pico Power Project Fact Sheet)
http://www.energy.ca.gov/sitingcases/picopower/index.html

California Energy Commission (Power Projects – An Overview)
http://www.energy.ca.gov/sitingcases/backgrounder.html

California Air Resources Board
http://www.arb.ca.gov/homepage.htm

California Air Resources Board (Air Quality, Emissions, and Modeling)
http://www.arb.ca.gov/html/aqe&m.htm

Bay Area Air Quality Management District
http://www.baaqmd.gov/

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ALTERNATIVES

Matt Trask

INTRODUCTION

This section considers potential alternatives to the construction and operation of the proposed Pico Power Project (PPP). The purpose of this alternatives analysis is to provide an analysis of a reasonable range of feasible alternatives that could substantially reduce or avoid any potentially significant adverse impacts of the proposed project (Cal. Code Regs., tit. 14, §15126.6; Cal. Code Regs., tit. 20, § 1765). This section identifies potentially significant impacts of the proposed project and analyzes different technologies and alternative sites that may reduce or avoid significant impacts. Staff has also analyzed the impacts that may be created by locating the project at alternative sites.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The "Guidelines for Implementation of the California Environmental Quality Act," Title 14, California Code of Regulation §15126.6(a), provide direction by requiring an evaluation of the comparative merits of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." In addition, the analysis must address the "no project" alternative (Cal. Code Regs., tit. 14, §15126.6(e)).

The range of alternatives is governed by the "rule of reason," which requires consideration only of those alternatives necessary to permit informed decision-making and public participation. The California Environmental Quality Act (CEQA) states that an environmental document does not have to consider an alternative for which the effect cannot be reasonably ascertained and of which the implementation is remote and speculative (Cal. Code Regs., tit. 14, §15125(d)(5)). However, if the range of alternatives is defined too narrowly, the analysis may be inadequate (City of Santee v. County of San Diego (4th Dist. 1989) 214 Cal. App. 3d 1438).

DESCRIPTION OF THE PROPOSED PROJECT

The proposed PPP would be a nominal 122 megawatt (MW) natural-gas-fired generating facility located on a 2.86-acre parcel owned by the applicant, Silicon Valley Power (SVP). The proposed site is located in an industrial area adjacent to an existing SVP electrical substation in the City of Santa Clara, in Santa Clara County, California. The PPP would consist of two General Electric LM-6000PC Sprint combustion turbine-generators (CTGs), a single condensing steam turbine generator (STG), a de-aerating surface condenser, a mechanical draft plume-abated cooling tower; and associated support equipment. The plant would also include two heat recovery steam generators (HRSGs) with duct burners. Total generating capacity would be 122 MW, with the ability to peak fire to 147 MW using the duct burners.

The proposed power plant would require a new 115-kilovolt (kV) switchyard, with the two CTGs each connected to a new three winding, three-phase step-up transformer and the STG connected to either of the existing step-up transformers connected to the 115 kV Kifer to Scott line at the plant switchyard. From the switchyard, the generated power would be transmitted into the Kifer and Scott Receiving stations. Natural gas for the facility would be delivered from Pacific Gas & Electric Company's (PG&E) gas distribution Line 132 via approximately 2.0 miles of new 12-inch diameter underground pipeline starting at the corner of Gianera Street and Wilcox Avenue, north of the PPP site, and extending to the gas compressor station. The plant would also include approximately 500 feet of new underground pipeline to convey compressed natural gas from the compressor station to the PPP site.

Plant cooling needs would be supplied by the San Jose/Santa Clara Water Pollution Control Plant (WPCP), located in the City of Alviso, via an existing South Bay Water Recycling Program pipeline located on the PPP site. SVP proposes to drill a new industrial well on the PPP site as an emergency backup supply of cooling water. The City of Santa Clara would provide domestic water for drinking, showers, sinks and general sanitary purposes from its municipal potable water system via a new connection to an existing on-site 12-inch potable water line. The City of Santa Clara's water supply comes from local wells and the Hetch Hetchy aqueduct.

SITE SELECTION

As stated in its Application for Certification (AFC), the applicant chose the proposed site because it is:

- Located near the centers of electrical demand from SVP customers;
- Located adjacent to a source of reclaimed waste water sufficient for plant cooling, thus avoiding the need for a lengthy pipeline and reducing environmental effects;
- Located near transmission facilities, such as the Kifer Receiving Station, making it unnecessary to construct significant new transmission facilities, thus reducing environmental effects;
- Zoned Public/Quasi-Public, which includes electrical utility uses and meets all City zoning requirements;
- Located 0.5 miles from the nearest residential area and 0.5 miles from sensitive receptors;
- Located approximately 2 miles from a readily available gas supply through the PG&E system; and,
- The project site is owned by the City of Santa Clara (SVP 2002, p. 9-4).

SCOPE AND METHODOLOGY OF THE ALTERNATIVES ANALYSIS

The purpose of staff's alternatives analysis is to provide a reasonable range of feasible alternatives that could substantially reduce or avoid any potentially significant adverse impacts of the proposed project. To accomplish this, staff must determine the appropriate scope of analysis. Consequently, it is necessary to identify and determine

the potentially significant impacts of the proposed project and then focus on alternatives that are capable of reducing or avoiding the significant impacts of the proposed project.

To prepare this alternatives analysis, staff used the following methodology:

- Identify the basic objectives of the project, provide an overview of the project, and describe its potentially significant adverse impacts, if any.
- Identify and evaluate technology alternatives to the project, including conservation and renewable sources.
- Identify and evaluate alternative locations or sites.
- Evaluate the impacts of not constructing the project, known as the “no project” alternative under CEQA.

PROJECT OBJECTIVES

- Based on analysis of the PPP Application for Certification (AFC), the Energy Commission staff has determined the project’s objectives are:
- To provide economical, clean, and efficiently generated energy to the City Santa Clara's ratepayers;
- To meet SVP's projected growth in industrial demand for electricity;
- To economically replace power supply that will no longer be available after the expiration of an existing power supply contract in 2005 that supplies about approximately 25 percent of SVP's needs;
- To provide system reliability and transmission congestion benefits; and,
- To locate the power plant near the sources of demand for maximum efficiency and system benefit.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS

Staff’s assessment of environmental impacts is presented in detail in the individual sections of this Staff Assessment. No significant impacts are identified, assuming that all recommended mitigation is incorporated. The alternatives analysis therefore focuses on identifying sites or technology that would lessen or avoid impacts relative to the proposed project. Therefore, alternative sites are evaluated by comparing the relative severity of the potential impacts in the technical areas that are generally of most concern in power plant siting: land use, noise, biological resources, visual resources, and water and soils.

SITE ALTERNATIVES

Three sites were identified as potential power plant site alternatives: the Gianera Site, the Scott Receiving Station Site, and the SVP Cogen Site. Like the proposed PPP site, all three alternative sites are previously disturbed sites located adjacent to electrical equipment (power plants or substations) owned by the applicant. All three sites are

similar in character to the proposed site, and site-related biological impacts would likely be similar to that at the proposed site. However, some sites would require construction of additional linear projects, such as natural gas or water pipelines, or electric transmissions lines, which could have effects on biological resources along the linear project routes.

The following discussion includes a detailed analysis of each potential alternative site, and the relative advantages and disadvantages of developing a power plant at the site, compared to the proposed PPP site.

SCREENING CRITERIA USED TO SELECT ALTERNATIVE SITES

The following criteria were used to identify potential alternative sites:

- The site should avoid or substantially lessen one or more of the potential significant effects of the project; and
- The site should meet most of the project objectives:
    a. Location. In order to meet reliability objectives, the site should be located near the SVP electrical market.
    b. Site suitability. Sufficient land is needed to construct and operate a generating facility of this size. The proposed power plant would be located on approximately 3 acres of land. Therefore, Staff used 3 acres as the minimum lot size needed to construct and operate the facility.
    c. Availability of infrastructure. The site should be within a reasonable distance of natural gas, water supply, and transmission interconnections.
- The site should be vacant.
- The site should not be located adjacent to moderate or high density residential areas, sensitive receptors (such as schools and hospitals), or recreation areas.

Please see **ALTERNATIVES Figure 1** for a map showing the relative location of these three sites.

GIANERA SITE

The Gianera site is located within an 11-acre parcel between Centennial Boulevard, Lafayette Street, and the San Francisco 49er professional football team headquarters, approximately 2 miles north of the proposed PPP site. The Gianera site is owned by SVP and is the site of both SVP's Northern Receiving Station (substation) and SVP's Gianera Generation Plant, the largest components of which are two 24 MW GE gas turbines, and two 4.5 million gallon water storage tanks. An electrical transmission right-of-way with four PG&E 115 kV transmission lines on two double-circuit towers runs along the eastern and southern borders of the parcel. A 24-inch gas pipeline main runs adjacent to the site along Gianera Street, and a 6-inch gas line, tapped off of the main gas pipeline, runs along the southern border leading to the Gianera power plant. The eastern border of the parcel has a large reclaimed water main that can carry up to 10 million gallons daily.

ALTERNATIVES Figure 1
Map of Alternative Sites

The closest residence to the Gianera Site is part of a large residential development that begins approximately 100 feet away from the site, and there are hundreds of sensitive receptors identified within 1 mile of the site (PPP, 2002).

Advantages

- **Infrastructure:** Reclaimed water, natural gas, and electrical transmission lines are located on or near the site; and the site contains an existing electrical generating substation, the SVP Northern Receiving Station.
- **Land Use**: This land is zoned Public/Quasi-Public and a power plant at this location would be consistent with this zoning.

Disadvantages

- **Noise:** The Gianera site is approximately 100 feet from a residential development. Though perhaps possible, constructing the project to meet the City of Santa Clara's noise standards would be very difficult and expensive.
- **Site Constraints:** The site is only 2.18 acres in size, which may be insufficient to allow construction of a power plant sufficient to meet SVP's needs.
- **Visual Resources:** The Gianera site has relatively open space to the east and north, while a residential development borders the site on the south. The site would be visible from recreation trails in the San Tomas Aquino corridor located adjacent to the site on the west, as well as from some of the rides within the Great American Amusement Park, the eastern border of which is approximately 500 feet west of the Gianera site. Construction of a power plant on this site would likely result in visual impacts to the residents south of the site and perhaps to users of the trails in the San Tomas Aquino corridor and of the amusement park, though a full analysis would be needed to assess the relative severity of the impacts.

SCOTT RECEIVING STATION SITE

The Scott Receiving Station (SRS) is located on 6 acres near Space Park Drive and Raymond Street, approximately 0.5 miles north of the proposed PPP site. The eastern portion (4 acres) of the SRS site is currently used for the SVP Scott 115/60 kV Receiving Station. The remaining portion (2 acres) is currently unused. A gas pipeline runs adjacent to the site along Space Park Drive, and a reclaimed water main is located approximately 1,200 feet east of the property along Lafayette Street. Two 115 kV transmission lines are located on the property, along with multiple 60 kV lines.

The closest sensitive receptor is 0.3 miles from the site, and the nearest residence is approximately 0.75 miles away.

Advantages

- **Infrastructure:** The site is located in an existing industrial area, and natural gas, water and electric transmission lines are nearby.
- **Land Use:** This land is zoned Public/Quasi-Public and a power plant at this location would be consistent with the surrounding industrial land uses.

- **Visual Resources**: A power plant at this location would be consistent with the surrounding industrial uses, and impacts to visual resources would likely be similar to that at the proposed site.

Disadvantages

- **Site Constraints:** The site is only 2 acres in size, which may be insufficient to allow construction of a power plant sufficient to meet SVP's needs.
- **Noise:** The nearest sensitive receptor is 0.3 miles away. Though feasible, designing the project to meet the City of Santa Clara's noise standards would be relatively expensive.
- **Infrastructure Connections:** A 1,200-foot water supply pipeline would need to be built to this site to supply project cooling, or dry cooling technology would need to be incorporated into the project design. A 3- to 4-mile natural gas pipeline would also need to be constructed to serve a power plant at this site.

SVP COGEN SITE

The SVP Cogen site is located near Robert Avenue and De La Cruz Boulevard. The current property, which is 326 feet by 173 feet, has a 7 MW combined-cycle plant that provides steam to California Paperboard and energy to SVP. A major reclaimed water line and a PG&E natural gas main are close to the plant. A small- to medium-sized power plant could be installed next to the existing cogeneration plant, which would subsequently be removed. However, existing electrical transmission lines would be insufficient to serve a power plant of this nature.

The closest sensitive receptor is 1 mile from the site, and the nearest residence is approximately 1 mile away.

Advantages

- **Infrastructure:** The site is located in an existing industrial area, and natural gas, water and electric transmission lines are nearby.
- **Noise:** No sensitive receptors are nearby.
- **Land Use:** This land is zoned Heavy Industrial and a power plant at this location would be consistent with the surrounding industrial land uses.

Disadvantages

- **Transmission System Engineering**: The transmission line serving the site would require upgrading, or a new line would be needed, in order to deliver SVP's power needs from a plant constructed at this site into the SVP system.
- **Site Constraints:** The site is only 1.29 acres in size, which may be insufficient to allow construction of a power plant large enough to meet SVP's needs.
- **Infrastructure Connections:** A water supply pipeline of up to 4 miles in length would need to be built to this site to supply project cooling, or dry cooling technology would need to be incorporated into the project design.

NO PROJECT ALTERNATIVE

The no project alternative under CEQA assumes that the project is not constructed. In the CEQA analysis, the no project alternative is compared to the proposed project and determined to be superior, equivalent, or inferior to it. The CEQA Guidelines state that "the purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (Cal. Code Regs., tit. §15126.6(i)). Toward that end, the no project analysis considers "existing conditions" and "what would be reasonably expected to occur in the foreseeable future if the project were not approved…." (§15126.6(e)(2)).

The no project alternative assumes that the power plant will not be constructed. If this facility were not constructed, the proposed site would likely remain vacant for at least the near-future, and the construction and operational impacts of the PPP would not occur. The area could remain vacant or would be available for another industrial use, such as a smaller power plant that would be under the City's permitting authority, and the water proposed to be used by the plant would be available for other uses.

However, if the project were not constructed, the proposed PPP would not contribute to California's electricity resources, increase competition, nor help form a more reliable electric system that meets the goals of the deregulated energy market. Due to market forces, the proposed facility may also serve to replace older, inefficient facilities; this replacement may not occur in the absence of the plant's construction.

ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS

This section describes alternatives that did not satisfy the screening criteria for inclusion in the more detailed analysis presented above, and include the following:

- Other alternative sites
- Demand-side management
- Other generation technology
- Renewable energy generation technology

Each of these alternatives, and the reasons they were not considered in detail in this analysis, is addressed below.

CEQA guidelines state that the alternatives discussion need not consider alternatives that are either infeasible or do not avoid significant environmental impacts. The following sections define other sites that were considered as alternatives to the PPP project and the reasons for their elimination from consideration.

OTHER ALTERNATIVE SITES

Neither the applicant nor Energy Commission staff is aware of any site in the Santa Clara area that would meet the project objectives. Because staff's analysis concludes that constructing and operating the proposed PPP would not result in significant

unmitigated impacts to the environment and public health, staff did not conduct an exhaustive search for alternate sites. Staff considers it unlikely that another site could be found in the Santa Clara area that would offer greater net benefits to the residents and ratepayers of the city, nor that would have less impact on public health or the environment, than the proposed site or the three alternate sites discussed above.

CONSERVATION AND DEMAND-SIDE MANAGEMENT

Conservation and demand-side management (DSM) include a variety of approaches, including energy efficiency and conservation, building and appliance standards, load management and fuel substitution. Public Resources Code Section 25305(c) states that conservation, load management, or other demand reducing measures reasonably expected to occur shall be explicitly examined in the Energy Commission's energy forecasts and shall not be considered as alternatives to a proposed facility during the siting process. The forecast that will address this issue is the Commission's California Energy Outlook. Thus, such alternatives are not included in this analysis.

Since 1975, the displaced peak demand from all of these efforts has been roughly the equivalent of 18 power plants with 500 MW of generating capacity each. The annual effect from enactment of new building and appliance standards has increased steadily, from 600 MW saved in 1980 to 5,400 MW in 2000, as more new buildings and homes around the U.S. are built under increasingly stringent energy efficiency standards. Savings from energy efficiency programs implemented by utilities and state agencies have also increased (from 750 to 3,300 MW in the same timeframe). Recent demand management proposals from the Governor and Legislature reduced consumption by an average of 3,500 MW during the summer of 2001 (CEC, 2001a). In addition, voluntary conservation measures adopted by residential and commercial/industrial users in response to the current energy situation led to a 7.5 percent drop in electricity use throughout the state as of August 2001; but that by October 2001 voluntary measures were accounting for only a 1.5 percent reduction in energy use (CEC, 2001a).

GENERATION TECHNOLOGY ALTERNATIVES

Alternate Generating Technology Evaluation Criteria

The following criteria were used to evaluate alternative generative technologies:

- Commercial availability - The technology has to be proven commercially at an acceptable cost.
- Feasibility - The technology has to be capable of implementation within the City.
- Environmental, health and safety impacts - The technology cannot have significant adverse impacts on the environment, public health, or public or worker safety.
- Relative costs - Technologies that were not rejected based on the first three criteria were evaluated with respect to their relative costs.

Technologies Rejected as Not Commercially Available at an Acceptable Cost

The following generating technologies are currently under development and/or testing, but they were not considered, because they are not currently commercially available at a reasonable cost:

- Kalina Combined Cycle, which uses a mixture of water and ammonia in the heat recovery boiler.
- Advanced gas turbine technologies, including humid air turbines, chemically recuperated gas turbines, and intercooled steam recuperated gas turbines.
- Magnetohydrodynamics.
- Fuel cells.
- Integrated gasification combined-cycle.

Technologies Rejected as Not Capable of Implementation within the City

The following generating technologies were not considered, because they cannot be reliably implemented within the City:

- Hydroelectric - The resources required for hydroelectric generation do not exist within the City.
- Geothermal - There are no geothermal resources within the City.
- Wind generation - Wind generation was eliminated from consideration due to the large land area required, the poor wind resource in the City, and the lack of energy generation during peak demand periods.
- Solar/Photovoltaics - These technologies would require large land areas, which are not available within the City, in order to provide the proposed generating capacity.

Technologies Rejected Because of Potential Adverse Impacts

Technologies relying on oil, coal, or other solid fuels for fuel were rejected because of the higher air pollutant emission rates that tend to be associated with these fuels. These technologies include:

- Coal or other solid fuel-fired conventional furnace/boiler steam turbine generators.
- Atmospheric and pressurized fluidized bed combustion boilers.
- Direct and indirect coal-fired combustion turbines.
- These higher emission rates have the potential for causing significant adverse impacts on air quality and/or public health.

Evaluation of Other Generating Technologies

The following technologies were evaluated further:

- Natural gas-fired simple-cycle.
- Natural gas-fired conventional combined-cycle.

- Natural gas-fired conventional furnace/boiler steam turbine-generator.
- Natural gas-fired supercritical boiler steam turbine-generator.

Efficiency for a natural gas-fired combined cycle system is typically 50 to 58 percent, resulting in lower air emissions per kilowatt hour (kWh) than simple-cycle gas turbine systems or conventional boiler-steam systems. In addition, natural gas combustion in a state-of-the-art combined-cycle unit emits less NO_X, CO, VOC, SO_X, and PM_{10}. Because of its high efficiency, low air pollutant emissions, and low generation costs, this technology was selected for the Project.

Simple-cycle gas turbines have a low capital cost, have efficiency approaching 35 percent, and are fast-starting. Air quality impacts are higher with this technology than with combined-cycle technology because the high exhaust gas temperatures make it more difficult to control NO_X and because more fuel must be burned to produce the equivalent amount of power as compared to a natural gas-fired conventional combined-cycle facility. Because of the relatively low efficiency and high emissions rate, this technology was eliminated from consideration.

Natural gas-fired conventional furnace/boiler steam turbine generators are less efficient (35 to 40 percent) than combined-cycle technology and emit more air pollutants per kWh generated. Due to the large size and complex nature of the equipment required, the capital costs and time to construct are greater. In addition, the cost of generation is comparatively high. Based on lower plant efficiency, higher emissions per kWh generated, higher capital costs, and increased labor costs to operate and maintain the facility, this technology was eliminated from consideration.

The efficiency of natural gas-fired supercritical boiler steam turbine-generators are higher than conventional boiler steam turbine-generator systems (generally 38 to 45 percent), but additional capital costs are incurred to construct the generating units. As a result, the costs to produce power using supercritical technology are somewhat lower than conventional technology, but higher than natural gas-fired combined-cycle technology. Based on lower plant efficiency, higher emissions per kWh generated, and higher capital and operating costs, this technology was eliminated from consideration.

RENEWABLE ENERGY GENERATION TECHNOLOGY

Staff considered several alternative generation technologies that do not burn fossil fuels: solar, wind, biomass, geothermal, and hydropower.

Solar Generation

There are two types of solar generation: solar thermal power and photovoltaic (PV) power generation.

Solar thermal power generation involves the conversion of solar radiation to thermal energy, which is then used to run a conventional steam power system. Solar thermal is a viable alternative to conventional generation systems and, depending on the technology, is suited to either distributed generation on the kW scale or to centralized power generation on scales up to several hundred MW. Current solar thermal systems utilize three designs to generate electricity: parabolic trough concentrating collectors,

power tower/heliostat configurations, and parabolic dish collectors. Parabolic trough and power tower systems typically run conventional power units, such as steam turbines, while parabolic dish systems power a small engine at the focal point of the collector.

PV power generation involves the direct conversion of light to electricity. PV is best suited to distributed generation uses rather than centralized power generation. PV is the most capital intensive of any alternative generation technology. PV power systems consist of solar electric modules (built from PV cells) assembled into arrays of varying sizes to produce electric power proportional to the area of the array and the intensity of the sunlight. PV arrays can be mounted on either the ground or on buildings. They can be installed on dual-purpose structures such as covered parking lots.

Solar resources would require large land areas in order to generate 122 MW of electricity. Specifically, assuming location in an area receiving maximum solar exposure (such as desert areas of San Bernardino County), central receiver solar thermal projects require approximately 5 acres per MW, so 122 MW would require approximately 620 acres, which is more than 200 times the amount of land area that would be taken by the proposed plant site and linear facilities. At 10 percent sun conversion efficiency, PV generation requires 1 square kilometer (about 400 acres) to produce at least 100 MW of power and 600 MWh of energy per day.

Although air emissions are significantly reduced or eliminated for solar facilities, they can have significant visual effects. Solar generation results in the absence or reduction in air pollutant emissions, and visible plumes. Water consumption for solar generation is substantially less than for a natural gas fired plant because no thermal cooling is needed for PV generation, and only a comparatively small amount is needed for solar thermal generation.

Like all technologies generating power for sale into the state's power grid, solar thermal facilities and PV generation require access to transmission lines. Large solar thermal plants must be located in desert areas with high direct normal insolation, and in these remote areas, transmission availability is limited. Additionally, solar energy technologies cannot provide full-time availability due to the natural intermittent availability of sunlight. Therefore, solar energy technologies do not meet the project needs, which is to supply immediate electric generation to accommodate peaks in electricity demand.

Wind Generation

Wind carries kinetic energy that can be utilized to spin the blades of a wind turbine rotor and an electrical generator, which then feeds alternating current (AC) into the utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40 percent of the wind's kinetic energy into electricity. Modern wind turbines represent viable alternatives to large bulk power fossil power plants as well as small-scale distributed systems. The range of capacity for an individual wind turbine today ranges from 400 watts up to 3.6 MW. California's installed 1,671 MW of wind power represented 3.7 percent of the state's electrical capacity in 2002 (AWEA, 2002; CAISO, 2002).

Although air emissions are significantly reduced or eliminated for wind facilities, they can have significant visual effects and wind turbines also cause bird mortality (especially for raptors) resulting from collision with rotating blades.

Wind resources would require large land areas in order to generate 122 MW of electricity. Depending on the size of the wind turbines, wind generation "farms" generally can require between 5 and 17 acres to generate 1 MW (resulting in the need for between 610 and 2,074 acres to generate 122 MW) (CEC, 2001b). Although 7,000 MW of new power wind capacity could cost-effectively be added to California's power supply, the lack of available transmission access is an important barrier to wind power development (Beck, 2001). California has a diversity of existing and potential wind resource regions that are near load centers such as San Francisco, Los Angeles, San Diego and Sacramento (CEC, 2001e). However, wind energy technologies cannot provide full-time availability due to the natural intermittent availability of wind resources. Therefore, wind generation technology would not meet the project's goal, which is to provide immediate power to meet peaks in demand.

Biomass Generation

Biomass generation uses a waste vegetation fuel source such as wood chips (the preferred source), agricultural waste, municipal solid waste, animal wastes, waste from food processing, aquatic plants, and algae. The fuel is burned to generate steam. Another fuel for biomass plants is methane. Methane is a flammable gas produced from landfill wastes through anaerobic digestion, gasification or natural decay. Gasifiers are also used to convert biomass into a combustible gas, biogas. The biogas is then used to drive a high-efficiency, combined-cycle gas turbine. Currently, more than 100 power plants in 31 states burn landfill-generated methane (NREL, 2002). In California, there are 31 power plants that burn landfill gas, which generate a total of 183 MW (CEC, 2000).

In general, biomass facilities can generate substantially greater quantities of air pollutant emissions than natural gas burning power plants. In addition, biomass plants are typically sized to generate less than 20 MW, which is substantially less than the capacity of the 122 MW PPP project. At the peak of biomass industry, 66 biomass plants were in operation in California. Currently, there are about 30 direct-combustion biomass facilities in operation (CEC, 2001c).

In order to generate 122 MW, which is proposed for PPP, six biomass facilities generating 20 MW each would be required. However, these power plants would have potentially significant environmental impacts of their own.

Geothermal

Geothermal technologies use steam or high-temperature water (HTW) obtained from naturally occurring geothermal reservoirs to drive steam turbine/generators. There are vapor dominated resources (dry, super-heated steam) and liquid-dominated resources where various techniques are utilized to extract energy from the HTW. Geothermal is a commercially available technology, but it is limited to areas with geologic conditions resulting in high subsurface temperatures. Although geothermal resources do exist in

California, no viable geothermal resources exist in Santa Clara County nor the San Francisco Bay region (CEC, 2001d).

Hydropower

While hydropower does not require burning fossil fuels, there are no significant undeveloped hydrologic resources in the project area. Additionally, this power source can cause significant environmental impacts, caused primarily by the inundation of potentially valuable habitat and interference with fish movements during their life cycles. As a result of these impacts, it is extremely unlikely that new hydropower facilities could be developed and permitted in the Santa Clara region within the next several years.

Conclusion Regarding Alternative Technologies

Alternative generation typically provides lower efficiencies, has specific resource needs, environmental impacts, permitting difficulties, and intermittent availability. Therefore, they do not fulfill a basic objective of this plant: to provide reliable power to SVP's ratepayers. Consequently, staff does not believe that these renewable technologies present feasible alternatives to the proposed project.

CONCLUSIONS

Staff does not believe that alternative technologies (geothermal, solar, wind, biomass, and hydroelectric) currently present feasible alternatives to the proposed project. While the no project alternative would eliminate all impacts of this project, the benefits of increasing in-state generation would also not be achieved, and impacts could be shifted to other locations.

The major differences among the sites are their relative noise and visual impacts, and their proximity to required infrastructure and the construction impacts associated with those infrastructure connections. All three alternative sites would be located on suitable parcels, though none are large enough to allow development of a plant the size of the proposed PPP. The largest of the three alternative sites could perhaps accommodate a power plant of about 80 MW, but would likely create significant, unmitigable noise impacts to nearby residents, as well as visual impacts to the residents and users of nearby recreational resources. Of the other two, one would require a longer natural gas pipeline and a quarter-mile long water pipeline, and the other would require new or upgraded transmission facilities.

The proposed project would require only minor new transmission and water conveyance facilities, but it would require 2 miles of new natural gas pipeline. The three site alternatives considered in this section offer some advantages and disadvantages in comparison to the proposed project, but no clear advantages to the proposed site. Additionally, the proposed site has no identified significant impacts, and none of the three alternative sites appear to be large enough to meet project objectives. Therefore, no alternative is recommended over the proposed project.

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